TC-K96

AEP Mod
E Model
Canadian Model
UK Model
US Model

SONY
STEREO CASSETTE DECK TC-K96R

(APE, UK, E model)

STEREO CASSETTE DECK

SPECIFICATIONS

GENERAL

Power Requirements:	120V ac, 60Hz (*US, Canadian model) 110, 120, 220, or 240V ac 50/60Hz adustable, (AEP, UK, E model)
Power Consumption:	30W (US, Canadian model) 33W (AEP, UK, E model)
AC Outlet:	Unswitched 300W total (US, Canadian model)
Dimensions:	Approx. 460(w)x155(h)x325(d)mm 18 $^{1}/_{8}$(w)x6 $^{1}/_{8}$(h)x12 $^{7}/_{8}$(d) inches including projecting parts and controls (US, Canadian model) Approx. 430(w)x155(h)x325(d)mm 17(w)x6 $^{1}/_{8}$(h)x12 $^{7}/_{8}$(d) inches including projecting parts and controls (AEP, UK, E model)
Weight:	Approx. 9.4 kg, 20 lb 12 oz. (US, Canadian model) Approx. 8.5 kg, 18 lb 12 oz. (AEP, UK, E model)

TAPE RECORDER SECTION

Track:	4-track 2-channel stereo
Fast Forward and Rewing Time:	Approx. 90 seconds with Sony cassette C-60

— Continued on page 2 —

'**Dolby**' and the double-D symbol are the trade marks of Dolby Laboratory Inc. Noise reduction system manufactured under license from Dolby Laboratory Inc.

SAFETY RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT
À LA SÉCURITÉ !

LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY.

MICROFILM

SONY®

SERVICE MANUAL

Frequency Response: DOLBY NR OFF
- With Ferri-Chrome cassette
  20–18,000 Hz
  30–16,000 Hz (±3 dB)
  30–16,000 Hz (DIN)
- With chromium dioxide cassette
  20–17,000 Hz
  30–15,000 Hz (±3 dB)
  30–15,000 Hz (DIN)
- With standard cassette
  20–15,000 Hz
  30–13,000 Hz (DIN)

Wow and Flutter: 0.05% WRMS (NAB)
±0.14% (DIN)

S/N Ratio: DOLBY NR OFF
- With Ferri-Chrome cassette
  59 dB at peak level (NAB)
  57 dB (DIN, 1975 rev.)
- With chromium dioxide cassette
  57 dB at peak level (NAB)

DOLBY NR ON
Improved by 5 dB at 1 kHz,
10 dB above 5 kHz

Total Harmonic Distortion: 1.3%

Record Bias Frequency: 105 kHz

Inputs: MIC (two phone jacks)
sensitivity 0.25mV (–70 dB)
for a low-impedance microphone
LINE IN (two phono jacks)
sensitivity 77.5mV (–20 dB)
input impedance 100k ohms

Outputs: VARIABLE LINE OUT (two phono jacks) output level
0.775V (0 dB) at load impedance
100k ohms with LINE OUT level control at "10"
suitable load impedance more than 10k ohms
FIXED LINE OUT (two phono jacks) output level 0.435V (–5 dB)
at load impedance 100k ohms
suitable load impedance more than 10k ohms
HEADPHONES (binaural jack)
output level –20 to –50 dB
at load impedance 8 ohms

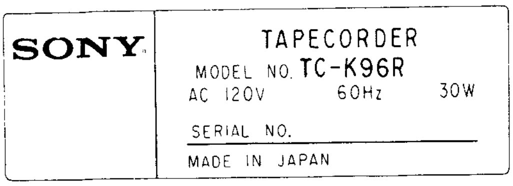
Other Jack: REC/PB (connector) (UK, AEP, E model)
input impedance less than 10k ohms
output impedance less than 10k ohms

0 dB = 0.775 V

- MODEL IDENTIFICATION

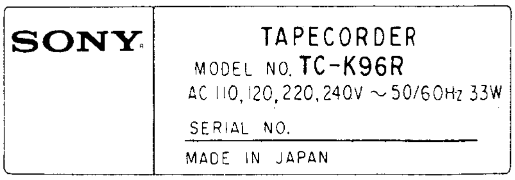
—Specification Label—

US, Canadian model



SONY
TAPECORDER
MODEL NO. TC-K96R
AC 120V 60Hz 30W
SERIAL NO.
MADE IN JAPAN

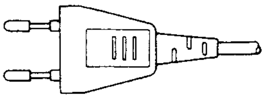
AEP, UK, E model



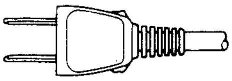
SONY
TAPECORDER
MODEL NO. TC-K96R
AC 110, 120, 220, 240V ~ 50/60Hz 33W
SERIAL NO.
MADE IN JAPAN

– Power Cord (E model) –

euro-plug (1-551-216-00)



parallel blade plug (1-534-754-00)



MOS IC HANDLING PRECAUTIONS

Since the insulation resistance of the oxidized film of MOS IC is generally very high and the film is extremely thin, the static electric charge on clothing or the body will cause the insulation to breakdown.

IC601 (μPD547-022) and IC602 (TC4019P) are used for this unit. Observe the following precautions when replacing these ICs:

1. Maintain all the pins at the same potential by wrapping the IC in aluminum foil or other similar material (See Fig. 1).

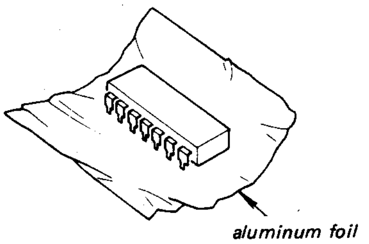


Fig. 1.

2. Ground the work bench for static electricity (See Fig. 2) (Place a sheet of aluminum onto the bench.)

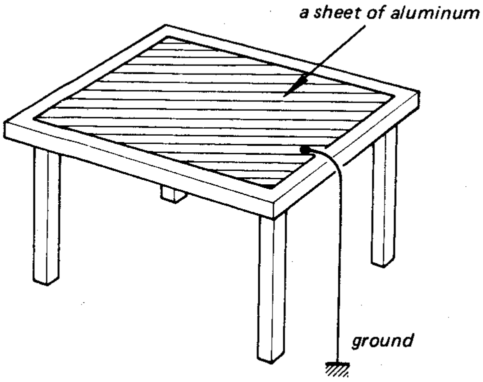


Fig. 2.

3. If necessary to touch the MOS IC direct, grasp the IC at a point other than the pins. Moreover, wear cotton gloves or a cotton finger sack. (Gloves made of nylon or other similar material are undesirable. The static electricity on your body can be easily discharged by wrapping a ground wire around your wrist.)

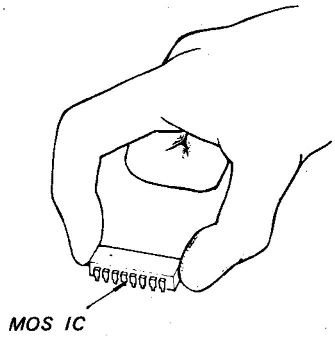


Fig. 3.

4. Short all the pins of the IC before beginning any work. Also ground the soldering iron.

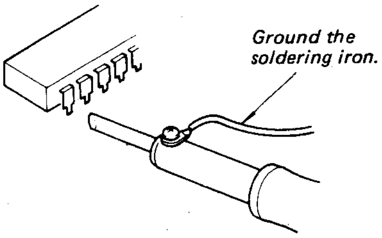
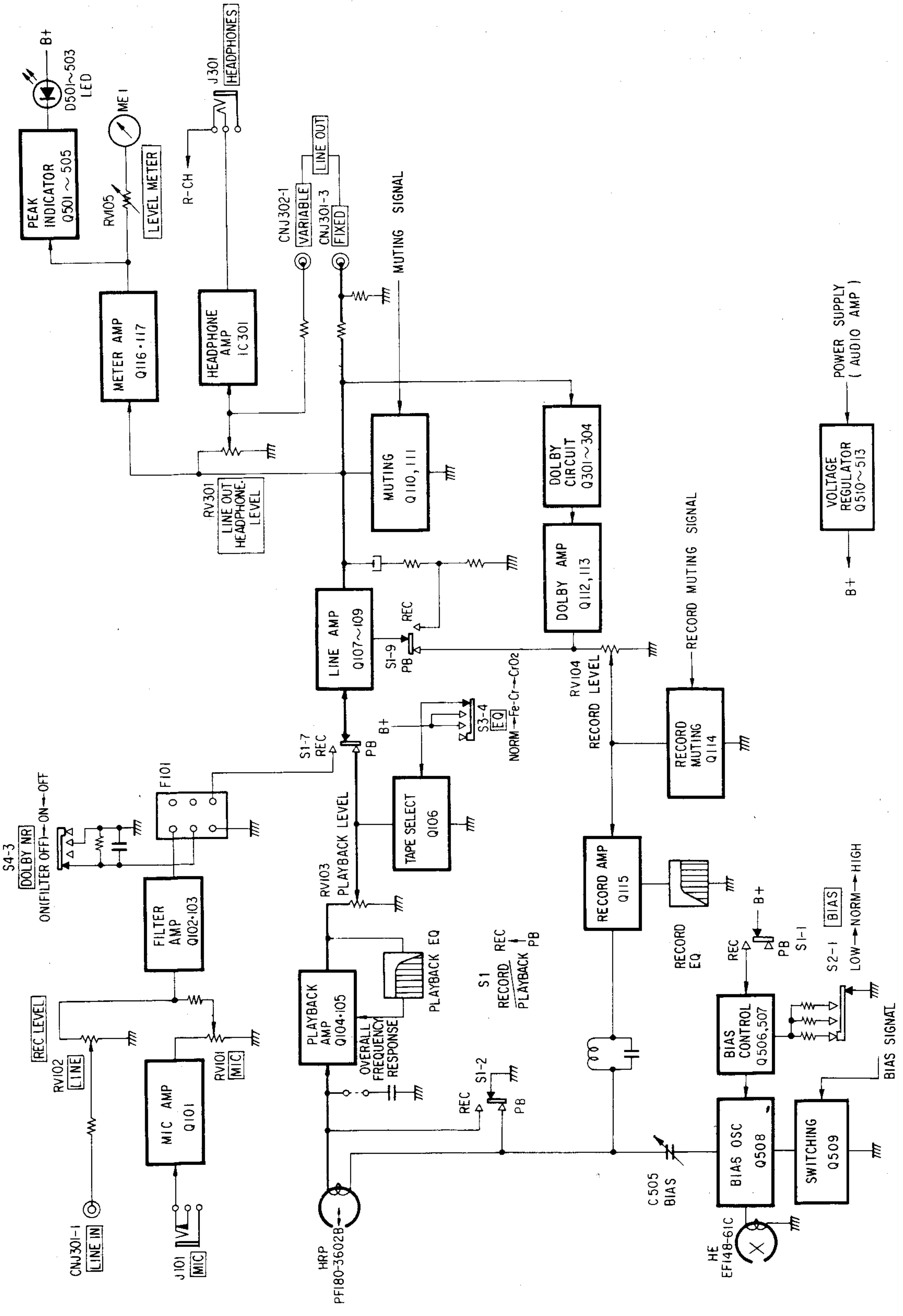


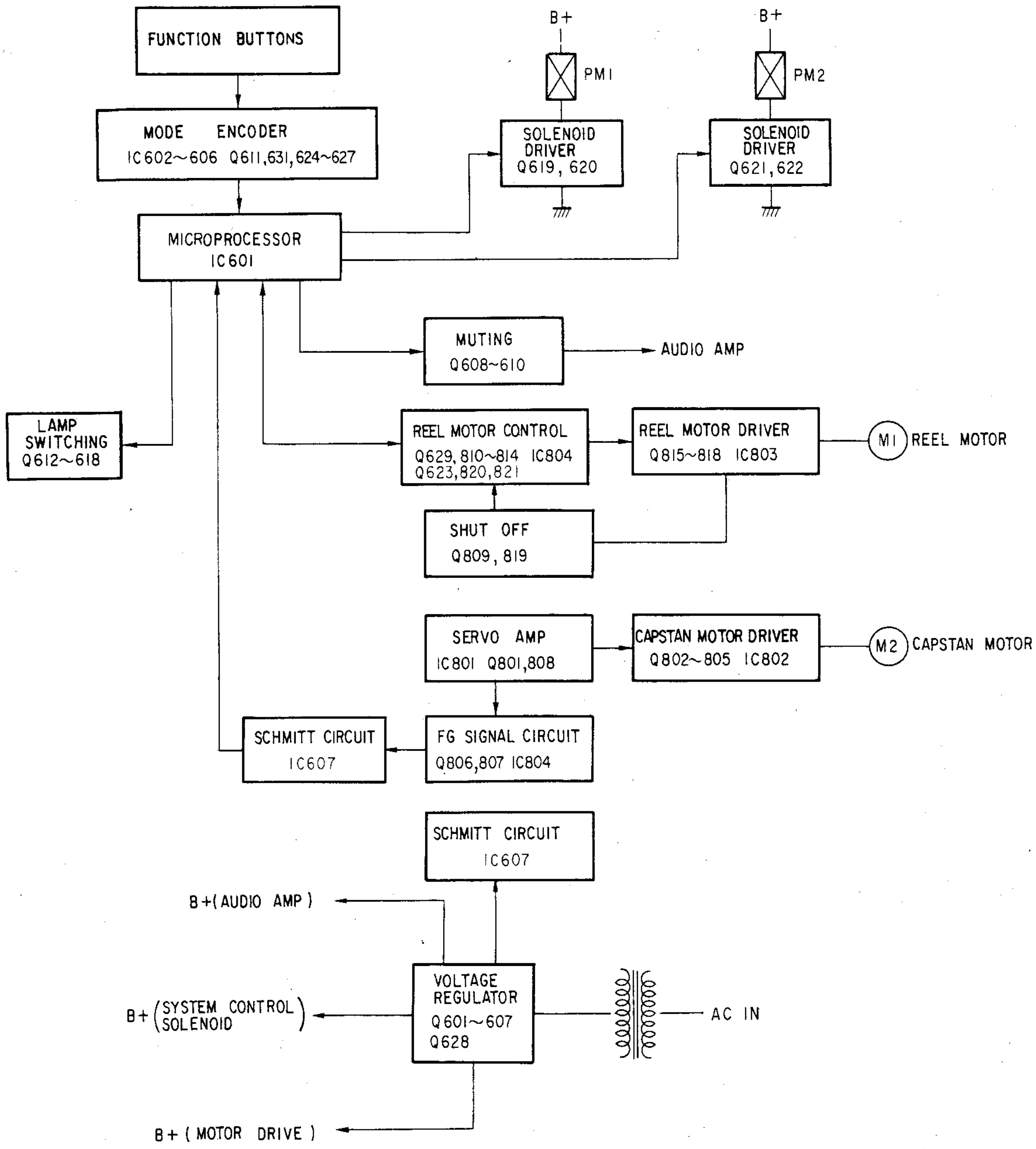
Fig. 4.

SECTION 1
OUTLINE

1-2. BLOCK DIAGRAM —Audio Amp Section—


PEAK INDICATOR Q501 ~ 505
D501~503 LED
B+
ME1
RV105
LEVEL METER
J301 HEADPHONES
R-CH
CNJ302-1 VARIABLE
CNJ301-3 FIXED
LINE OUT
MUTING SIGNAL
METER AMP Q116·117
HEADPHONE AMP IC301
MUTING Q110, 111
DOLBY CIRCUIT Q301~304
DOLBY AMP Q112, 113
POWER SUPPLY (AUDIO AMP)
VOLTAGE REGULATOR Q510~513
B+
RV301 LINE OUT HEADPHONE LEVEL
RECORD MUTING SIGNAL
LINE AMP Q107~109
REC
S1-9
PB
RV104
RECORD LEVEL
RECORD MUTING Q114
S3-4 EQ
NORM→Fe-Cr←CrO2
B+
S1-7 REC
PB
F101
S4-3 DOLBY NR
ON(FILTER OFF)←ON←OFF
TAPE SELECT Q106
RECORD AMP Q115
RV103 PLAYBACK LEVEL
FILTER AMP Q102·103
RECORD EQ
PLAYBACK EQ
S1 RECORD REC PLAYBACK PB
REC
B+
PB
S1-1
S2-1 BIAS
LOW←NORM←HIGH
REC LEVEL
RV102 LINE
RV101 MIC
PLAYBACK AMP Q104·105
OVERALL FREQUENCY RESPONSE
BIAS CONTROL Q506,507
BIAS SIGNAL
MIC AMP Q101
S1-2
REC
PB
BIAS OSC Q508
SWITCHING Q509
C505 BIAS
CNJ301-1 LINE IN
J101 MIC
HRP PF180-3602B
HE EF148-61C

1-1. BLOCK DIAGRAM –System Control Section–


FUNCTION BUTTONS
MODE ENCODER
IC602~606 Q611,631,624~627
MICROPROCESSOR
IC601
B+
PM1
SOLENOID DRIVER
Q619, 620
B+
PM2
SOLENOID DRIVER
Q621,622
MUTING
Q608~610
AUDIO AMP
LAMP SWITCHING
Q612~618
REEL MOTOR CONTROL
Q629, 810~814 IC804
Q623,820,821
REEL MOTOR DRIVER
Q815~818 IC803
M1
REEL MOTOR
SHUT OFF
Q809, 819
SERVO AMP
IC801 Q801,808
CAPSTAN MOTOR DRIVER
Q802~805 IC802
M2
CAPSTAN MOTOR
SCHMITT CIRCUIT
IC607
FG SIGNAL CIRCUIT
Q806,807 IC804
SCHMITT CIRCUIT
IC607
B+(AUDIO AMP)
B+(SYSTEM CONTROL SOLENOID)
VOLTAGE REGULATOR
Q601~607
Q628
AC IN
B+ (MOTOR DRIVE)

1-3. FUNCTION MECHANISM DESCRIPTION

The solenoid-driven mechanism changes modes from one to another.

Brake Release during fast forward mode and rewind mode. See Fig. 1-1.

1. Depress the function button ►► (FF) or ◄◄ (REW).
2. The plunger, which actuated by the solenoid PM2 supplied with direct current from Q622, moves in the direction shown by the arrow Ⓐ.
   When the brake solenoid slider moves along with the plunger, the head trigger lever moves in the direction shown by the arrow Ⓑ and releases the lock of the brake gear.
3. Being pulled by the spring, the brake gear turns in the direction shown by the arrow Ⓒ and comes into the drive gear. The brake gear turns furthermore in the direction shown by the arrow Ⓒ since the drive gear coupled with the flywheel is rotating in the direction shown by the arrow Ⓓ.
4. When the cam pushes the brake arm (A) in the direction shown by the arrow Ⓔ, the brake lever moves in the direction shown by the arrow Ⓕ and releases the brake.

Note:	FWD. . . forward	FF. . . . . fast forward
	REV. . . reverse	REW. . . rewind

Head Deck Drive during forward mode. See Fig. 1-2.

1. Depress the function button ► (FWD).
2. The plunger, which actuated by the solenoid PM 1 supplied with direct current from Q620, moves in the direction shown by the arrow Ⓐ.
   When the head solenoid slider moves along with the plunger, the head trigger lever moves in the direction shown by the arrow Ⓑ and releases the lock of the head gear.
3. Being pulled by the spring, the head gear turns in the direction shown by the arrow Ⓒ and comes into the drive gear.
   The head gear turns furthermore in the direction shown by the arrow Ⓒ since the drive gear coupled with the flywheel is rotating in the direction shown by the arrow Ⓓ.
4. When the cam pushes the head arm (A) in the direction shown by the arrow Ⓔ, the limiter plate moves in the direction shown by the arrow Ⓕ.
   Thus, the head deck is lifted and the head contacts the tape.
5. With the limiter plate moving, the brake lever moves in the direction shown by the arrow Ⓕ in Fig. 1-1 and releases the brake.

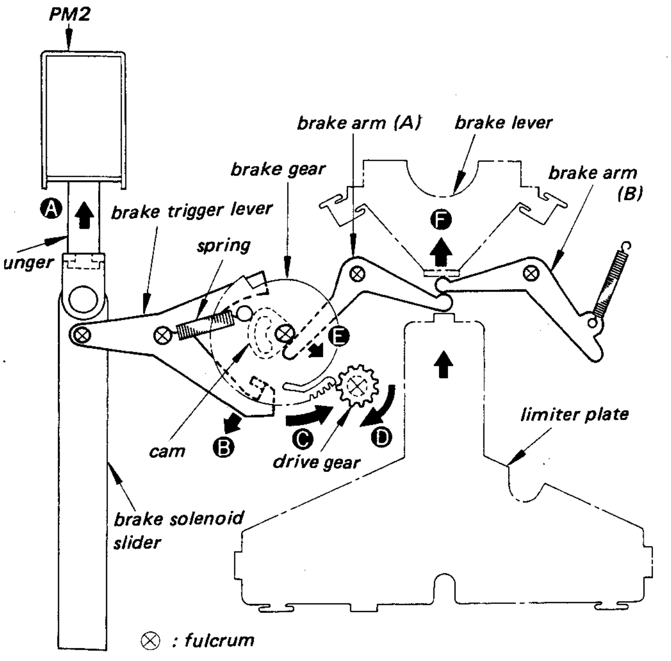

PM2
Ⓐ
brake trigger lever
unger
brake arm (A)
brake lever
brake gear
brake arm (B)
Ⓕ
spring
Ⓔ
cam
Ⓑ
Ⓒ
drive gear
Ⓓ
limiter plate
brake solenoid slider
⊗ : fulcrum

Fig. 1-1

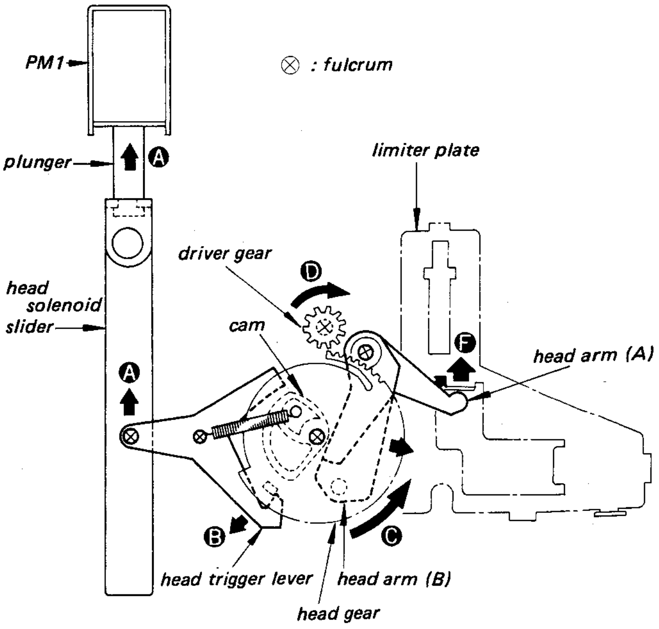

PM1
⊗ : fulcrum
plunger
Ⓐ
limiter plate
driver gear
Ⓓ
head solenoid slider
cam
Ⓕ
head arm (A)
Ⓐ
Ⓑ
Ⓒ
head trigger lever
head arm (B)
head gear

Fig. 1-2

Roto Bilateral Head Mechanism

Transition from FWD mode to REV mode.
See Fig. 1-3.

1. Depress the function button ◄ (REV) or set the DIRECTION MODE switch to make REV mode at the end of a tape in FWD mode.
2. When the plunger is actuated by the solenoid (PM 1) supplied with direct current from Q620, the head solenoid slider moves in the direction shown by the arrow Ⓐ .
3. The head solenoid slider lifts the reverse hook lever and the head gear turns in the direction shown by the arrow Ⓑ .
4. With the head gear turning, the cam pushes the head arm (B) in the direction shown by the arrow Ⓒ and the drive slider also moves in the same direction.
5. Since the drive slider and the direction slider are connected with the reverse hook lever, the direction slider moves in the direction shown by the arrow Ⓓ and the bilateral head gear is pushed in the direction shown by the arrow Ⓔ .
   Consequently, the record/playback head is turned 180-degree and the REV mode is set.

Transition from REV mode to FWD mode
See Fig. 1-4.

1. Depress the function button ► (FWD) or set the DIRECTION MODE switch to make FWD mode at the end of a tape in REV mode.
2. When the plunger is actuated by the solenoid (PM 1) supplied with direct current from Q620, the head solenoid slider moves in the direction shown by the arrow Ⓕ .
3. The head solenoid slider lifts the reverse hook lever and the head gear turns in the direction shown by the arrow Ⓖ .
4. With the head gear turning, the cam pushes the head arm (B) in the direction shown by the arrow Ⓗ and the drive slider also moves in the same direction.
5. Since the pin ❶ of the drive slider pushes the reverse lever in the direction shown by the arrow Ⓘ , the pin ❷ is pushed in the direction shown by the arrow Ⓙ and the reverse slider moves in the direction shown by the arrow Ⓚ .
6. Consequently, when the bilateral head gear is pushed in the direction shown by the arrow Ⓛ , the record/playback head is turned 180-degrees and the FWD mode is set.

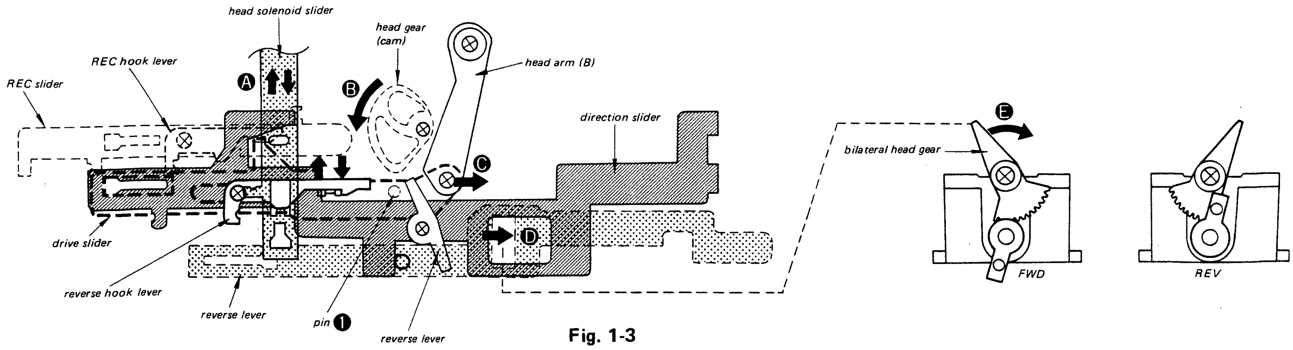

head solenoid slider
head gear (cam)
REC hook lever
REC slider
head arm (B)
Ⓐ
Ⓑ
Ⓒ
Ⓓ
Ⓔ
direction slider
bilateral head gear
drive slider
reverse hook lever
reverse lever
pin ❶
reverse lever
FWD
REV

Fig. 1-3

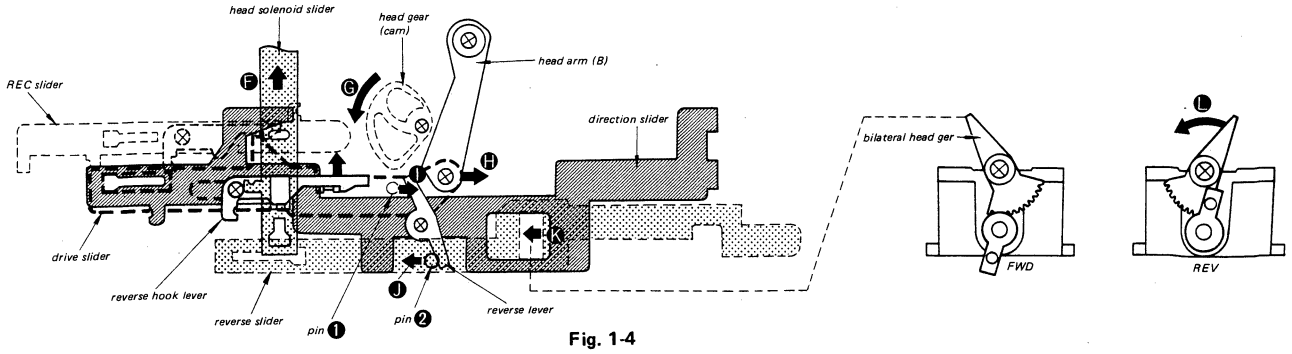

head solenoid slider
head gear (cam)
head arm (B)
REC slider
Ⓕ
Ⓖ
Ⓗ
Ⓘ
Ⓙ
Ⓚ
Ⓛ
direction slider
bilateral head ger
drive slider
reverse hook lever
reverse slider
pin ❶
pin ❷
reverse lever
FWD
REV

Fig. 1-4

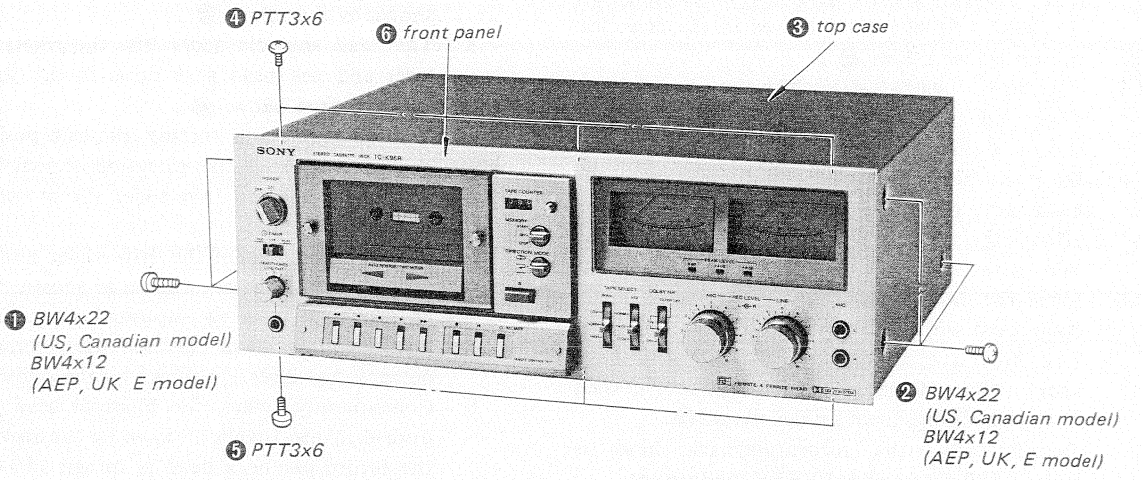
SECTION 2
DISASSEMBLY

- **Follow the disassembly procedure in the numerical order given.**

TOP CASE AND FRONT PANEL REMOVAL

❶–❸ : TOP CASE

❹–❻ : FRONT PANEL



❹ *PTT3x6*

❻ *front panel*

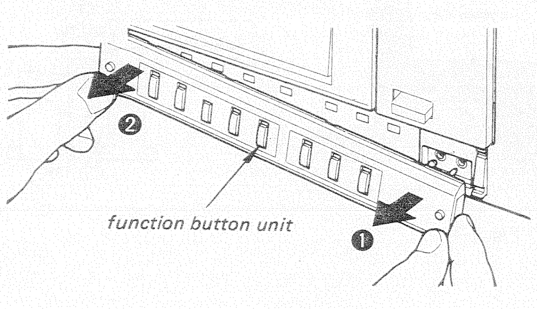
❸ *top case*

❶ *BW4x22*
(US, Canadian model)
BW4x12
(AEP, UK E model)

❺ *PTT3x6*

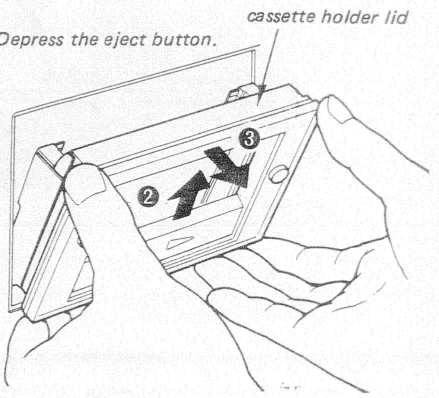
❷ *BW4x22*
(US, Canadian model)
BW4x12
(AEP, UK, E model)

FUNCTION BUTTON UNIT REMOVAL

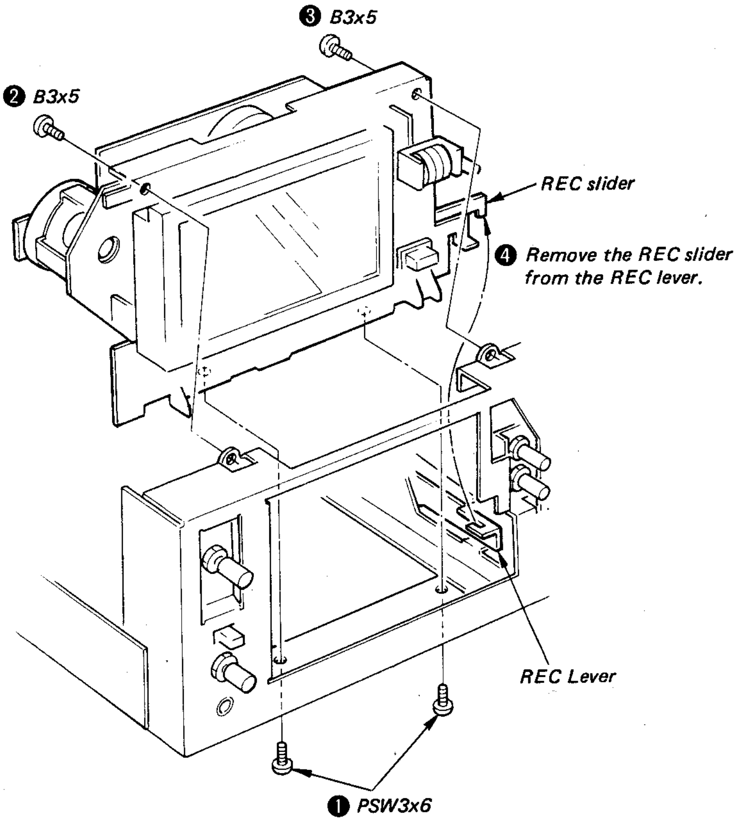

❷
function button unit
❶

CASSETTE HOLDER LID REMOVAL

❶ *Depress the eject button.*


cassette holder lid
❸
❷

MECHANICAL BLOCK REMOVAL


❸ B3x5
❷ B3x5
REC slider
❹ Remove the REC slider from the REC lever.
REC Lever
❶ PSW3x6

SECTION 3
ADJUSTMENTS

3-1. MECHANICAL ADJUSTMENTS

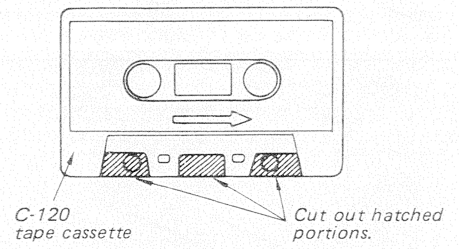
PRECAUTION

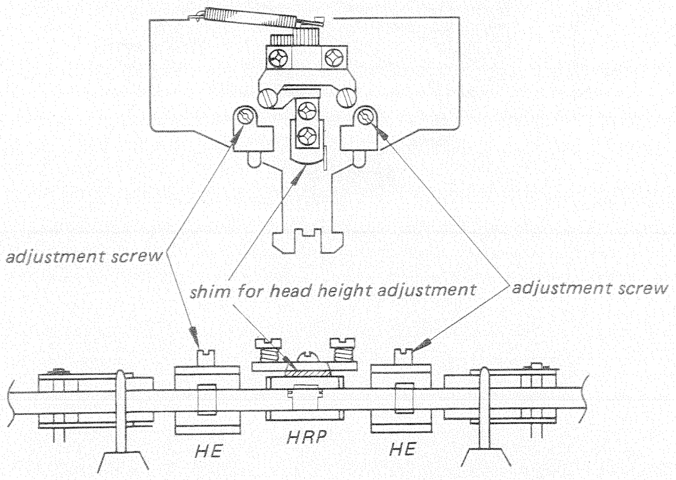
1. Clean the following parts with a denatured-alcohol-moistened swab:
   - record/playback head
   - erase head
   - capstan
   - pinch roller
   - rubber belts
   - idlers
2. Demagnetize the record/playback head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply a suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage unless otherwise noted.

Head Height Adjustment

– Playback Mode –

1. Prepare an adjustment cassette as shown below.

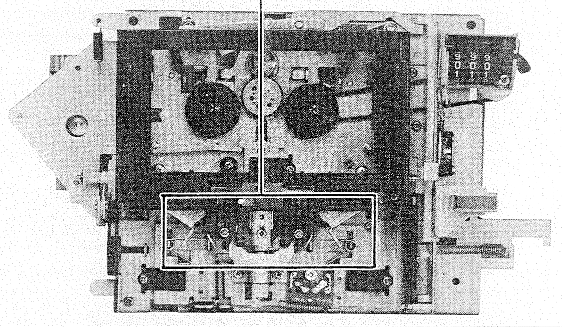

C-120
tape cassette
Cut out hatched
portions.


adjustment screw
shim for head height adjustment
adjustment screw
HE
HRP
HE

2. To eliminate tape curl and tape twist in FWD and REV mode, adjust the head heights by turning the adjustment screws or inserting the shim as shown.
3. After, the adjustments, apply suitable locking compound to the adjustment screws.

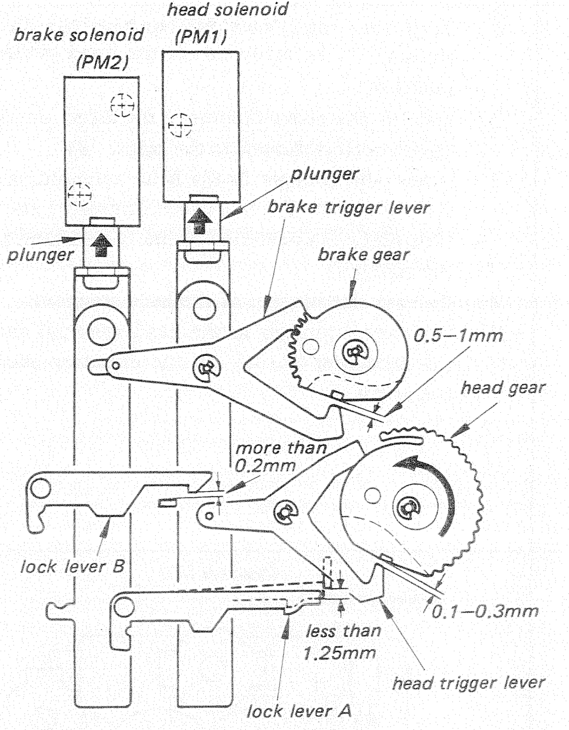
Shim, head height adjustment

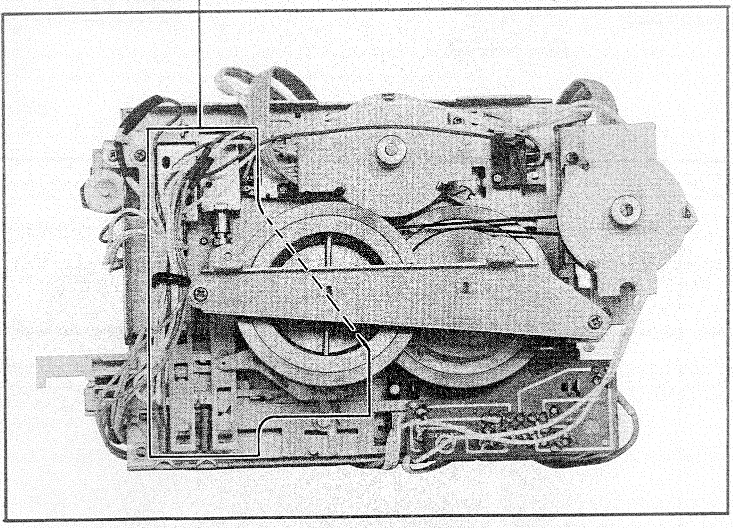
3-558-328-01	*t = 0.1*
3-558-328-11	*t = 0.2*
3-558-328-21	*t = 0.15*



Solenoid (PM 1, 2) Position Adjustment

1. Insert the plunger of the head solenoid in the direction shown by the arrow.
2. Adjust the position of the head solenoid so that the clearance between the head gear and the head trigger lever is 0.1–0.3 mm.
3. Make sure that the lock lever A is hooked to the protrusion by half when the head gear is turned counterclockwise.
4. Release the plunger of the head solenoid (PM 1).
5. Insert the plunger of the brake solenoid in the direction shown by the arrow.
6. Adjust the position of the brake solenoid so that the clearance between the brake gear and the brake trigger lever is 0.5–1 mm.
7. Make sure that the clearance between the protrusion and the lock lever B is more than 0.2 mm.
8. Release the plunger of the brake solenoid (PM 2).


head solenoid (PM1)
brake solenoid (PM2)
plunger
brake trigger lever
plunger
brake gear
0.5–1mm
head gear
more than 0.2mm
lock lever B
0.1–0.3mm
less than 1.25mm
head trigger lever
lock lever A

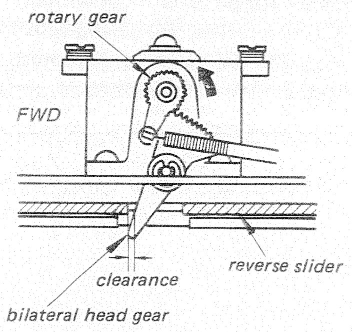


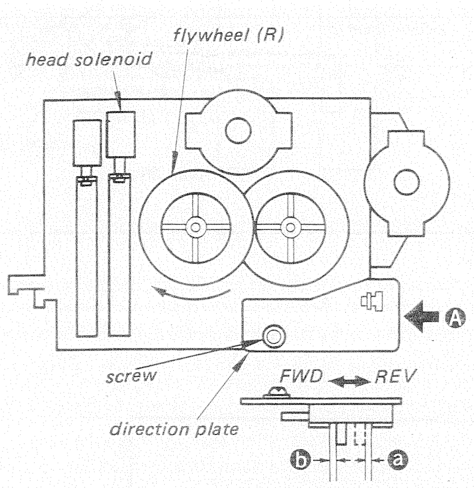
Direction Plate Position Adjustment

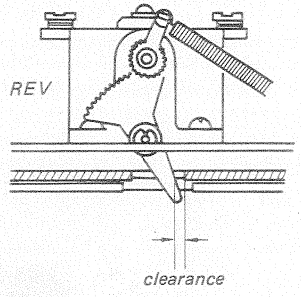
1. Turn the rotary-gear by hand in the direction shown by the arrow to set the head in the REV position.
2. Loosen the screw and move the direction plate in the direction shown by the arrow Ⓐ.
3. Insert the plunger in the head solenoid and turn the flywheel (R) clockwise. Therefore the direction plate is positioned properly and then tighten the screw.
4. Release the plunger of the head solenoid.
5. Insert the plunger in the head solenoid and turn the flywheel (R) 45° in the direction shown by the arrow.

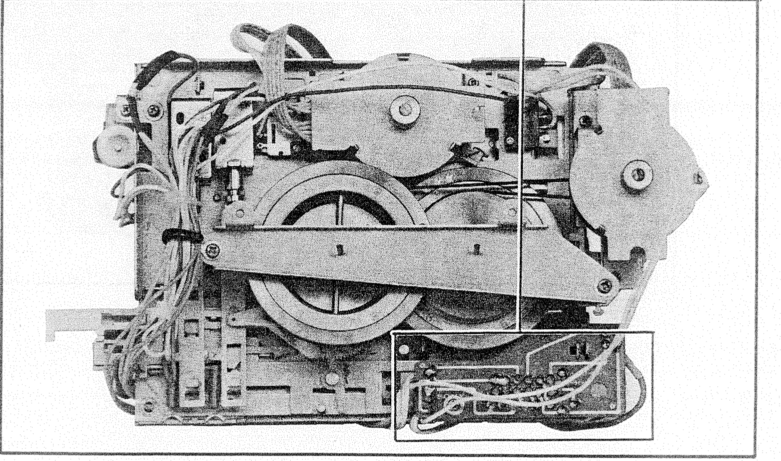
   Next, release the plunger and turn the flywheel (R) 360° in the direction shown by the arrow. Once again, insert the plunger in the head solenoid and make REV mode by turning the flywheel (R).

   At this moment, make sure that the clearance ⓐ is less than 1.5 mm and there is a clearance between the bilateral-head gear and the reverse slider.
6. Make FWD mode in the same manner as mentioned in step 3 and confirm that the clearance ⓑ is 0–0.5 mm and there is a clearance between the bilateral head gear and the reverse slider.


rotary gear
FWD
reverse slider
clearance
bilateral head gear

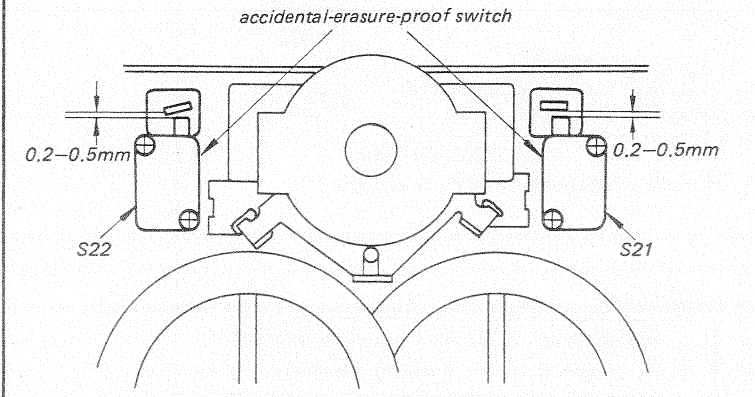

flywheel (R)
head solenoid
Ⓐ
screw
FWD ⟷ REV
direction plate
ⓑ
ⓐ

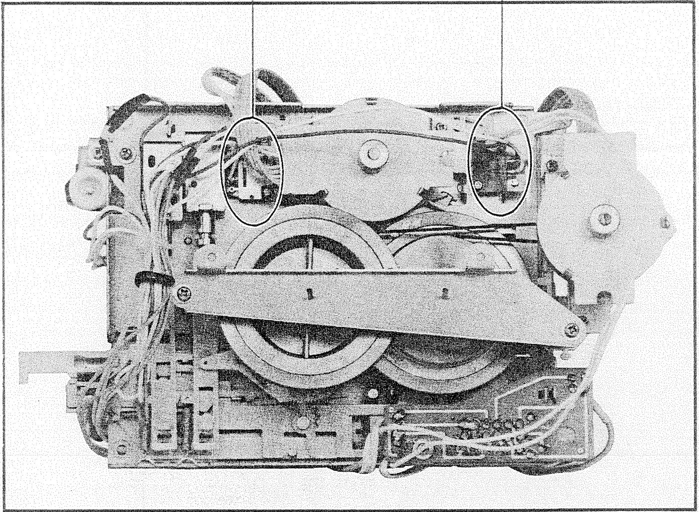

REV
clearance



Accidental-Erasure-Proof Switch (S 21, 22) Position Adjustment

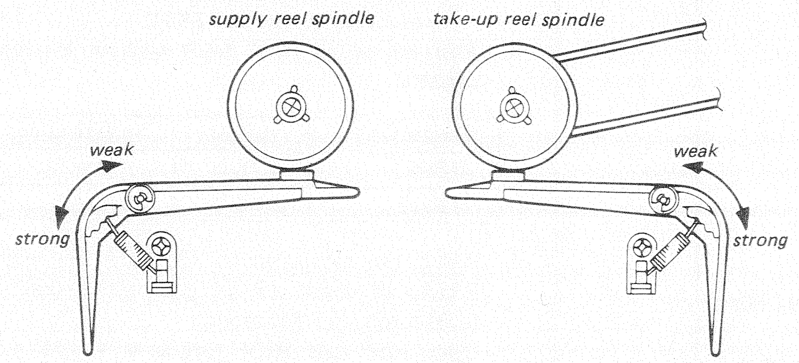
1. Install a cassette (with an erasure-proof tab).
2. Adjust the erasure proof switch position so that the clearance between REC detect lever and the erasure proof switch is 0.2–0.5 mm.

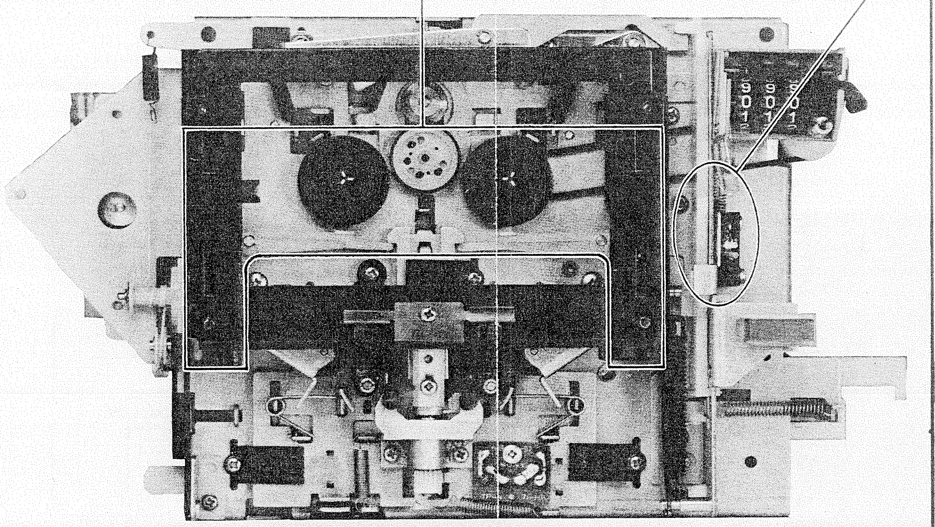

accidental-erasure-proof switch
0.2–0.5mm
0.2–0.5mm
S22
S21



Back Tension Torque Adjustment

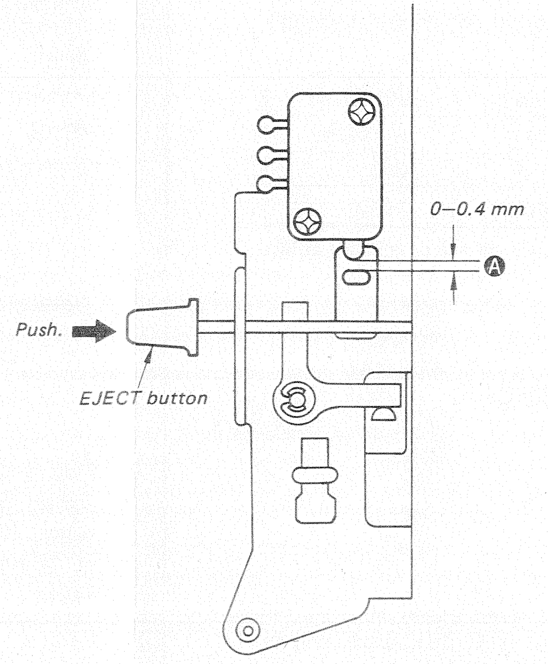
1. Install the torque meter CQ-102A and measure the back tension torque in FWD mode.
   Install the torque meter CQ-101A and measure the back tension torque in REV mode.
2. To meet the specified torque, change the hook position of the spring.
   Specification: 3–4.5 g.cm


supply reel spindle
take-up reel spindle
weak
strong
weak
strong



Cassette Lid Switch (S23) Position Adjustment

Adjust the cassette lid switch position so that the clearance Ⓐ is 0–0.4 mm when the cassette lid is opened by pushing EJECT button.


0–0.4 mm
Ⓐ
Push.
EJECT button

Brake Torque

Tight side:	50–200 g.cm (0.7–2.8 oz.inch)
Slack side:	20–100 g.cm (0.28–1.4 oz.inch)

Pinch Roller Pressure

400–500 g.cm (5.56–6.95 oz.inch)

3-2. ELECTRICAL ADJUSTMENTS

Note: The adjustment should be performed in the order given in this service manual.
The adjustments should be performed for both L-CH and R-CH.

BIAS and EQ switch settings in accordance with tape used are as follows.

Tape	BIAS switch	EQ switch
CS-10	NORMAL	NORMAL
CS-20	HIGH	CrO_2
CS-30	NORMAL	Fe-Cr

Switches and controls should be set as follows unless otherwise specified.

DOLBY NR switch:	OFF
EQ switch:	NORMAL
BIAS switch:	NORMAL
LINE OUT/HEADPHONES LEVEL:	MAX (fully clockwise)
TIMER switch:	OFF
MEMORY switch:	OFF
REC MUTE switch:	OFF
MODE switch:	——

Standard Record:

Supply the standard input signal level to the input jack and set the REC LEVEL control to obtain the standard output signal level.

Standard Input Level

	MIC	LINE IN
source impedance	300Ω	10 kΩ
input level	−60 dB (0.775mV)	−10 dB (0.25V)

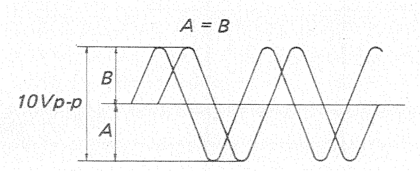
Standard Output Level

	LINE OUT VARIABLE	LINE OUT FIXED	HEAD-PHONES
load impedance	100 kΩ	100 kΩ	8Ω
output level	0 dB (0.775V)	−5 dB (0.44V)	

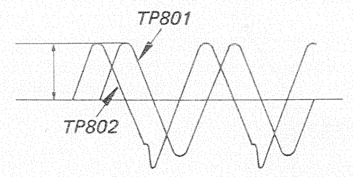
Capstan Motor Adjustment

1. Disconnect the 2-p connector and apply 1.5V dc between IN pin of the connector and TP800.

Terminal	Adjust	Specifications
TP801	RV819	A = B
	RV810	10Vp-p
TP802	RV816	A = B
	RV809	10Vp-p

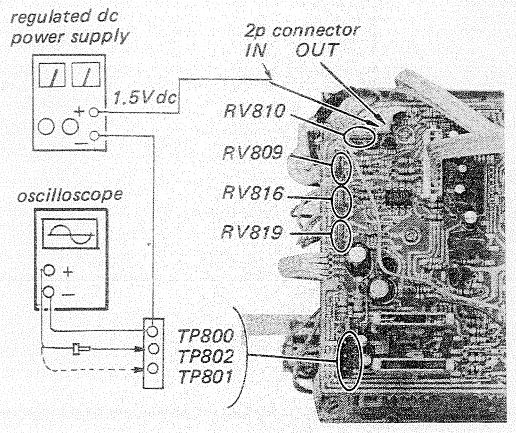


2. Plug in the 2-p connector, insert a cassette tape and set in FWD mode.
Adjust RV819 so that the positive peak voltage of TP802 equals the positive peak voltage of TP801.


TP801
TP802

Adjustment Location:

— Servo Amp Board —


regulated dc power supply
1.5Vdc
+
−
2p connector
IN
OUT
RV810
RV809
RV816
RV819
oscilloscope
+
−
TP800
TP802
TP801

Reel Motor Adjustment

1. Run the set in FWD mode without loading a cassette.
a)

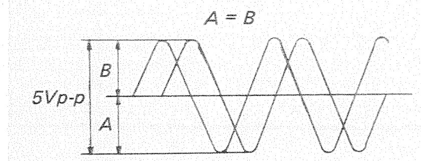
Terminal	Adjust	Specifications
TP851	RV860	A = B
TP852	RV874	A = B

b) Adjust RV854 so that the voltage at TP851 equals the voltage at TP852.

2. Run the set in REV mode without loading a cassette.

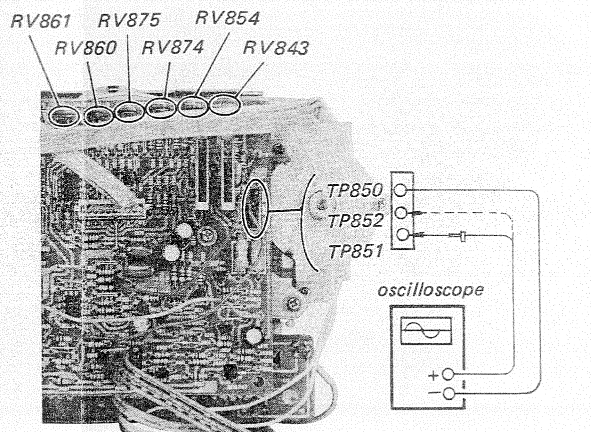
Terminal	Adjust	Specifications
TP851	RV861	A = B
TP852	RV875	A = B

3. Install the torque meter CQ-101A and adjust RV843 to obtain 45—50 g.cm (0.62—0.69 oz. inch) torque in FWD mode.
Make sure that REV torque is 42—55 g.cm (0.58—0.76 oz.inch).
4. Install a cassette and repeat the steps 1-a and 2.



Adjustment Location:

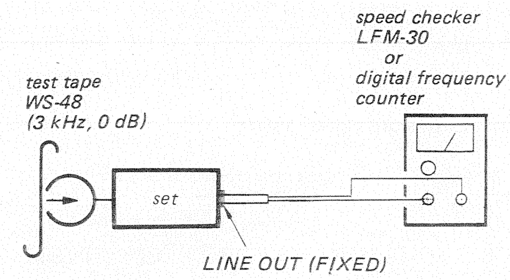
— Servo Amp Board —


RV861
RV875
RV854
RV860
RV874
RV843
TP850
TP852
TP851
oscilloscope
+
−

Tape Speed Adjustment

Procedure:

Mode: Playback


speed checker
LFM-30
or
digital frequency
counter
test tape
WS-48
(3 kHz, 0 dB)
set
LINE OUT (FIXED)

Adjust RV806 to obtain the specified values.

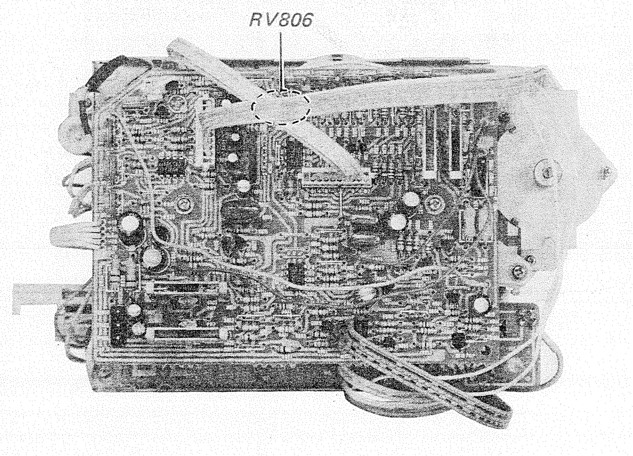
Specification:

Speed checker	Digital frequency counter
−0.7 — +0.7%	2,980 — 3,020 Hz

Frequency difference between beginning and end of tape should be within 0.7% (20 Hz).

Adjustment Location:

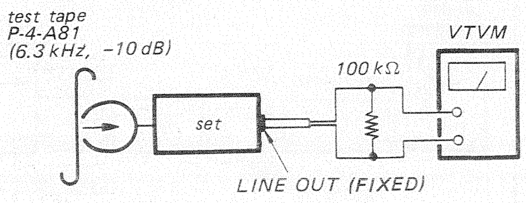
— Servo Amp Board —



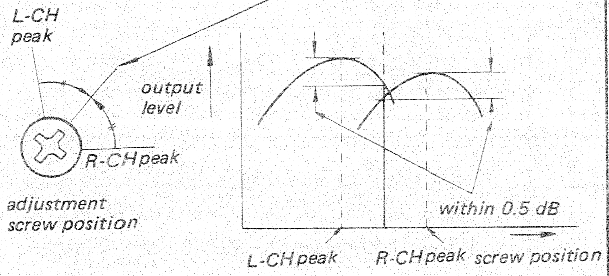
Record/playback Head Azimuth Adjustment

Procedure:

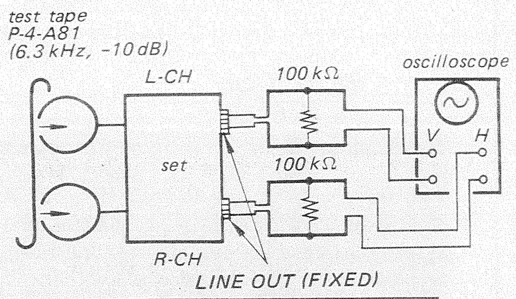
1. Mode: Playback

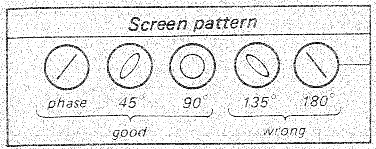

test tape
P-4-A81
(6.3 kHz, −10 dB)
VTVM
100 kΩ
set
LINE OUT (FIXED)

2. Turn the adjustment screw for the maximum level and set it to the mechanical mid position between L-CH and R-CH peak position.

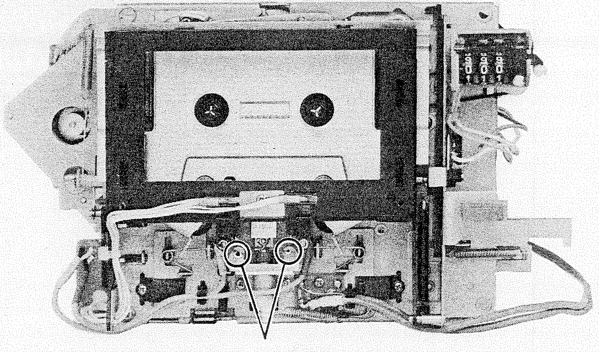

L-CH
peak
output
level
R-CH peak
adjustment
screw position
within 0.5 dB
L-CH peak
R-CH peak
screw position

3. Mode: Playback


test tape
P-4-A81
(6.3 kHz, −10 dB)
L-CH
100 kΩ
oscilloscope
V
H
set
100 kΩ
R-CH
LINE OUT (FIXED)


Screen pattern
phase
45°
90°
135°
180°
good
wrong

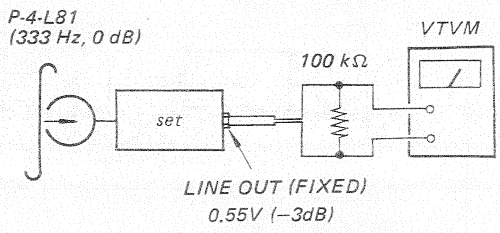
Adjustment Location:


adjustment screws

Playback Level Adjustment

Procedure:

1. Mode: Playback


P-4-L81
(333 Hz, 0 dB)
VTVM
100 kΩ
set
LINE OUT (FIXED)
0.55V (−3dB)

Adjust RV103 (L-CH) and RV203 (R-CH) to obtain the specified values.

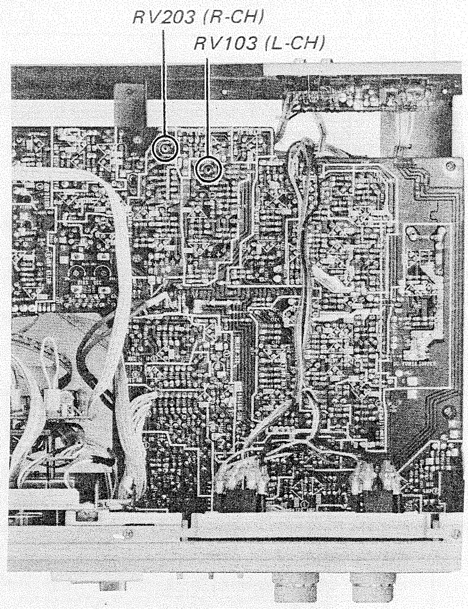
Specification:

LINE OUT level: 0.52−0.58 V
(−2.5 to −3.5 dB)

Check that LINE OUT level does not change in playback mode while changing the mode from playback to stop several times.

Adjustment Location:

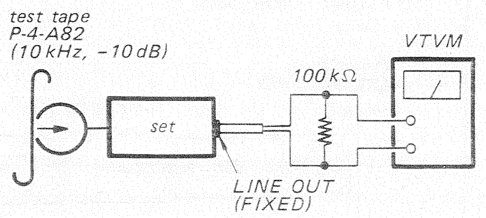
– Audio Amp Board –


RV203 (R-CH)
RV103 (L-CH)

Playback Equalizer Adjustment

Procedure:

Mode: Playback


test tape
P-4-A82
(10 kHz, -10 dB)
set
100 kΩ
VTVM
LINE OUT
(FIXED)

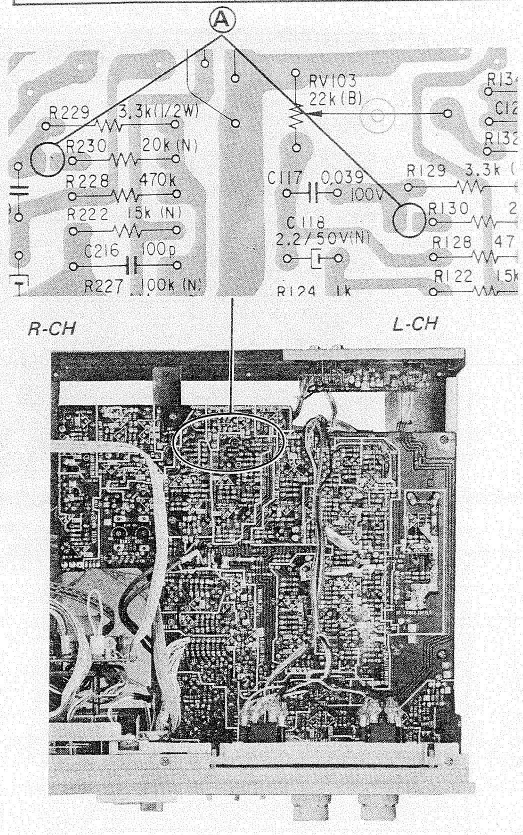
Solder or unsolder the patterns at Ⓐ to obtain specified values.

Specification:

EQ switch	LINE OUT (FIXED) level
NORMAL	0.15 – 0.20 V (–14.5 to –11.5 dB)
Fe-Cr or Cr-O_2	0.095 – 0.12 V (–18 to –16 dB)

Adjustment Location: *– Audio Amp Board –*

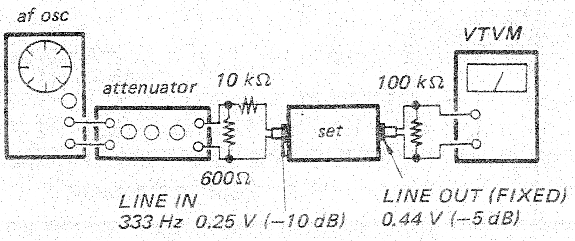
Bridge patterns	LINE OUT (FIXED) level
(open)	up
Ⓐ	down


Ⓐ
R229
3.3k(1/2W)
R230
20k (N)
R228
470k
R222
15k (N)
C216
100p
R227
100k (N)
RV103
22k (B)
C117
0.039
100V
C118
2.2/50V(N)
R124
1k
R129
3.3k
R130
R128
47
R122
15k
R-CH
L-CH

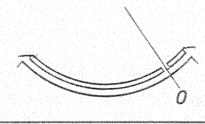
Level Meter Calibration

Procedure:

1. Mode: Standard record (See page 15.)

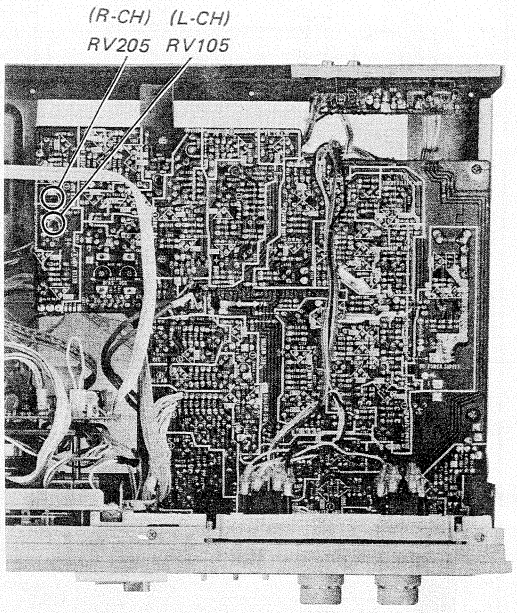

af osc
attenuator
10 kΩ
600Ω
set
100 kΩ
VTVM
LINE IN
333 Hz 0.25 V (–10 dB)
LINE OUT (FIXED)
0.44 V (–5 dB)

2.

Adjust	Level meter reading: 0 VU
RV105 (L-CH) RV205 (R-CH)	

Adjust RV105 (L-CH) and RV205 (R-CH) to obtain 0 VU reading on the level meter.

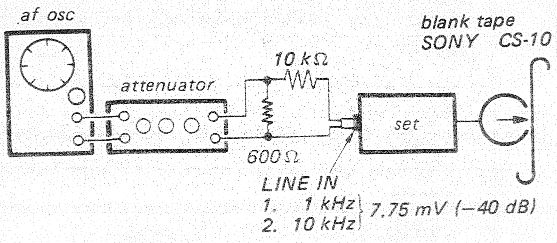
Adjustment Location: *– Audio Amp Board –*


(R-CH) (L-CH)
RV205 RV105

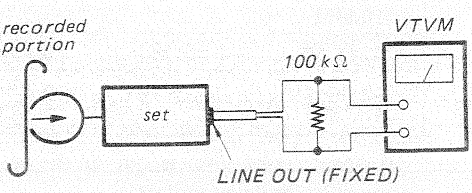
Record Bias Adjustment

Procedure:

1. Mode: Standard record (See page 15.)


af osc
attenuator
10 kΩ
600 Ω
set
blank tape
SONY CS-10
LINE IN
1. 1 kHz
2. 10 kHz
7.75 mV (−40 dB)

2. Mode: Playback


recorded portion
set
100 kΩ
VTVM
LINE OUT (FIXED)

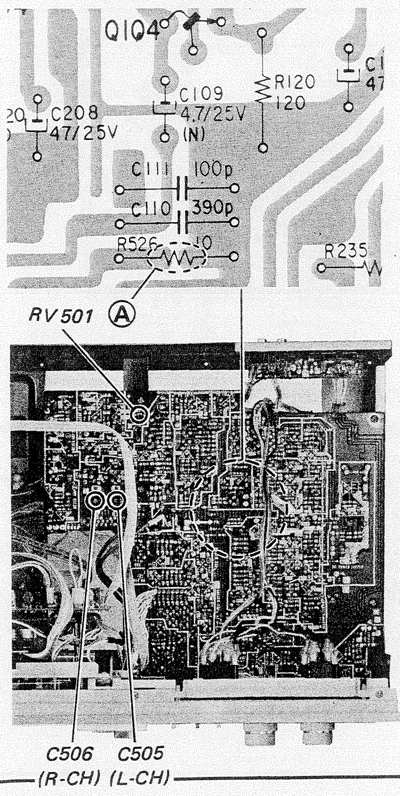
Adjust C505 (L-CH) and C506 (R-CH) to make 10 kHz and 1 kHz signal output levels equal.

Unsolder the pattern Ⓐ.

In REC·FWD mode, read the voltage across R526.

In REC·REV mode, adjust RV501 to make the voltage across R526 the same reading obtained in REC·FWD mode. After the adjustment, bridge the pattern at Ⓐ.

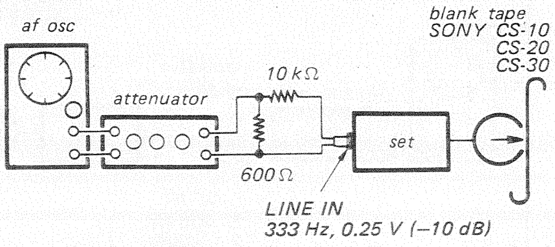
Adjustment Location: *– Audio Amp Board –*


Q104
C109
4.7/25V
(N)
R120
120
C208
47/25V
C111 100p
C110 390p
R526 10
R235
RV501 Ⓐ
C506 (R-CH)
C505 (L-CH)

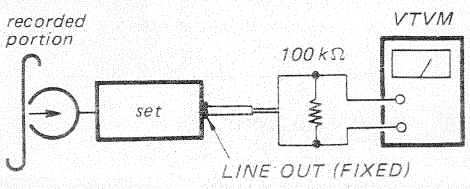
Record Level Adjustment

Procedure:

1. Mode: Standard record (See page 15.)


af osc
attenuator
10 kΩ
600 Ω
set
blank tape
SONY CS-10
CS-20
CS-30
LINE IN
333 Hz, 0.25 V (−10 dB)

2. Mode: Playback


recorded portion
set
100 kΩ
VTVM
LINE OUT (FIXED)

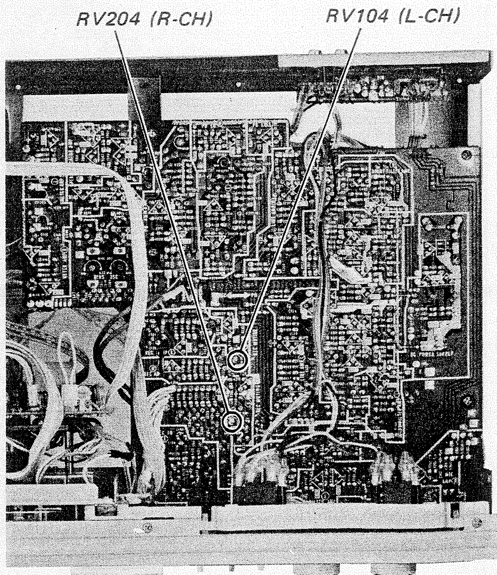
Adjust RV104 (L-CH) and RV204 (R-CH) to obtain the specified values.

Specification:

Tape	LINE OUT Level
CS-10	0.39 – 0.49 V (−6 to −4 dB)
CS-20	0.38 – 0.52 V (−6.5 to −3.5 dB)
CS-30	

Level difference between FWD and REV mode: less than 1 dB

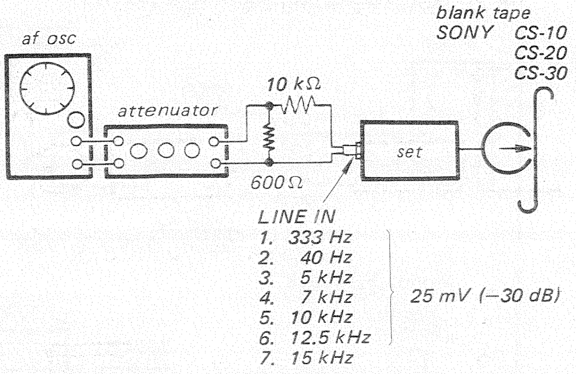
Adjustment Location: *– Audio Amp Board–*


RV204 (R-CH)
RV104 (L-CH)

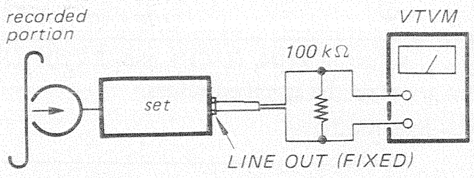
Overall Frequency Response Adjustment

Procedure:

1. Mode: Standard record (See page 15)


af osc
attenuator
10 kΩ
600 Ω
set
blank tape
SONY CS-10
CS-20
CS-30
LINE IN
1. 333 Hz
2. 40 Hz
3. 5 kHz
4. 7 kHz
5. 10 kHz
6. 12.5 kHz
7. 15 kHz
25 mV (−30 dB)

2. Mode: Playback


recorded portion
set
100 kΩ
VTVM
LINE OUT (FIXED)

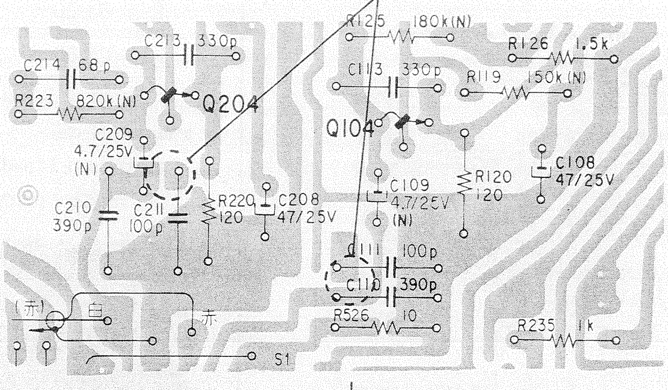
3. Measure the output level deviation of the each frequency from the output level of 333 Hz signal. The deviation should be as following table.

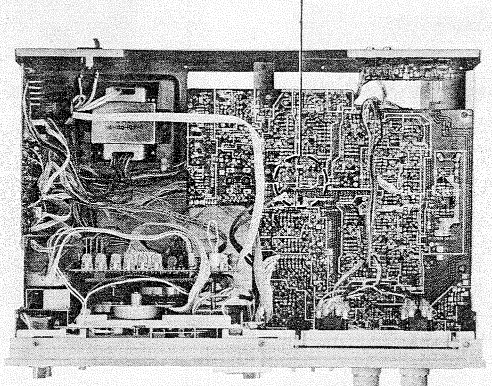
Tape / freq.	CS-10	CS-20	CS-30
40 Hz 5 kHz 7 kHz 10 kHz	0 ±2 dB		
12.5 kHz	−1 ±3 dB	0 ±3 dB	
15 kHz		0^{+3}_{-5} dB	

If the 15 kHz level is out of the specification, adjust by bridging patterns.

Adjustment Location *—Audio Amp Board—*

patterns to be bridged for adjustment

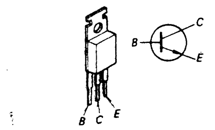

R125 180k(N)
C213 330p
R126 1.5k
C214 68p
C113 330p
R119 150k(N)
R223 820k(N)
Q204
Q104
C209 4.7/25V (N)
C108 47/25V
R120 120
C109 4.7/25V (N)
C210 390p
C211 100p
R220 120
C208 47/25V
C111 100p
C110 390p
R526 10
R235 1k
(赤)
白
赤
S1



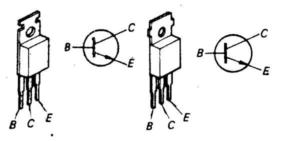
SECTION 4
DIAGRAMS

- **Replacement Semiconductors**
  For replacement, use semiconductors except in (   ).

Q601 : 2SC1173

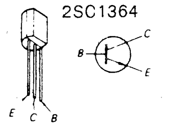


Q602 : 2SC1061 (2SC1419)

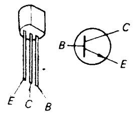

B
C
E
B
C
E
B
C
E
B
C
E

Q603, 607~619
Q621, 624~627, 631
Q801, 808, 810
Q820, 821, 629

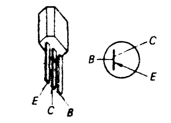
2SC1364



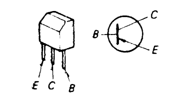
(2SC1634)



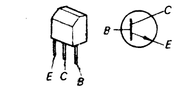
Q604 : 2SA678



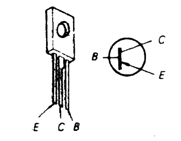
Q605, 606 : 2SB605



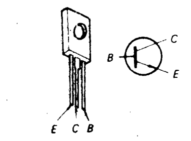
Q620, 622
Q628 } 2SD571



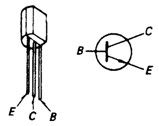
Q803, 804
Q816, 817 } 2SB548



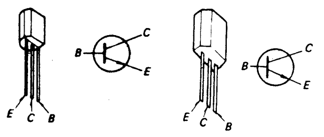
Q802, 805
Q815, 818 } 2SD414



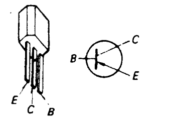
Q806, 807
Q809, 813 } 2SC1364 (2SC945)



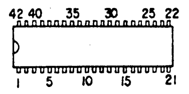
Q811, 812 : 2SC1364(2SC634A)


B
C
E
E
C
B
B
C
E
E
C
B

Q814, 819 : 2SA678 (2SA677)

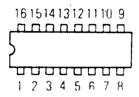


IC601 : μPD547-022


42 40 35 30 25 22
1 5 10 15 21

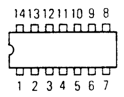
(Top view)

IC602 : TC4019P


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8

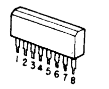
(Top view)

IC607 : TC4069P

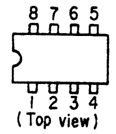

14 13 12 11 10 9 8
1 2 3 4 5 6 7

(Top view)

IC801 : CX-065A



IC802~804 : μPC4558C (μPC4558)
IC603~606 : μPC4557C (μPC4557)

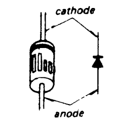


(Top view)

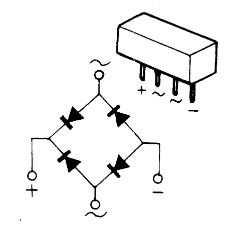
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

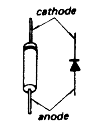
D608 : EQB01-15 (EQA01-15R)
D611 : EQB01-11Z (EQA01-11R)


cathode
anode

D605, 606 : S1VB10



D601~604, 607
D609, 619, 620 } 10E2
D627 : 1S1555 (1T40)
D801~809
D612~618
D621~623
D626 } 1S1555


cathode
anode

- All capacitors are in μF unless otherwise noted. pF = μμF 50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ = 1000Ω, MΩ = 1000 kΩ
- ▭ : nonflammable resistor.
- ▭ : fusible resistor.
- ▬▬ : B + bus.
- ☐ : adjustment for repair.
- ▬ ▬ ▬ : B−bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).

  ▶ : Forward
  ▶▶ : Fast Forward
  ◀ : Reverse
  ◀◀ : Rewind
no mark: stop

[   ]: Voltages taken from the indicated points to the ground of servo amplifier circuit in forward mode.

Note:
(The ground of servo amplifier circuit is isolated from the chassis ground which has zero potential. The difference in voltage between these two grounds is approximately 10 V.)

- Voltage variations may be noted due to normal production tolerances.

Seite 21 Leer

4-1. SCH

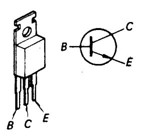
SYSTEM CONTROL BOARD

SECTION 4
DIAGRAMS

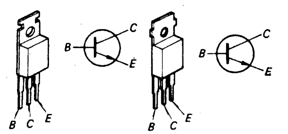
- **Replacement Semiconductors**

For replacement, use semiconductors except in ( ).

Q601 : 2SC1173

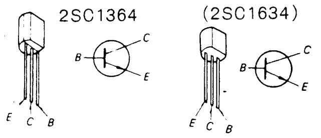


Q602 : 2SC1061 (2SC1419)

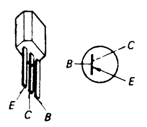


Q603, 607~619
Q621, 624~627, 631
Q801,, 808, 810
Q820, 821, 629

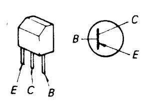
2SC1364 (2SC1634)



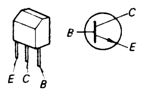
Q604 : 2SA678



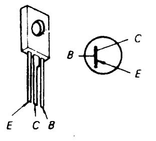
Q605, 606 : 2SB605



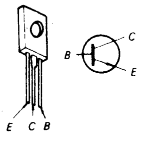
Q620, 622 } 2SD571
Q628



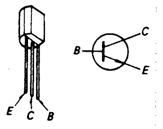
Q803, 804 } 2SB548
Q816, 817



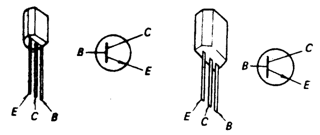
Q802, 805 } 2SD414
Q815, 818



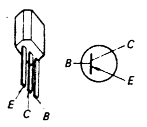
Q806, 807 } 2SC1364 (2SC945)
Q809, 813



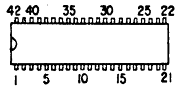
Q811, 812 : 2SC1364(2SC634A)



Q814, 819 : 2SA678 (2SA677)

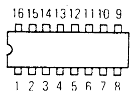


IC601 : μPD547-022


42 40 35 30 25 22
1 5 10 15 21

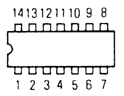
(Top view)

IC602 : TC4019P


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8

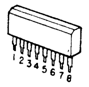
(Top view)

IC607 : TC4069P

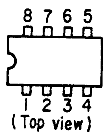

14 13 12 11 10 9 8
1 2 3 4 5 6 7

(Top view)

IC801 : CX-065A



IC802~804 : μPC4558C (μPC4558)
IC603~606 : μPC4557C (μPC4557)

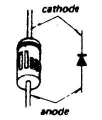


(Top view)

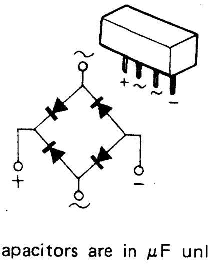
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

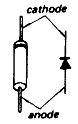
D608 : EQB01-15 (EQA01-15R)
D611 : EQB01-11Z (EQA01-11R)


cathode
anode

D605, 606 : S1VB10



D601~604, 607 } 10E2
D609, 619, 620
D627 : 1S1555 (1T40)
D801~809 } 1S1555
D612~618
D621~623
D626


cathode
anode

- All capacitors are in μF unless otherwise noted. pF = μμF 50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ = 1000Ω, MΩ = 1000 kΩ
- ⊡ : nonflammable resistor.
- ⊡ : fusible resistor.
- ━━━ : B + bus.
- ☐ : adjustment for repair.
- ━ ━ ━ : B−bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).

▶ : Forward
▶▶ : Fast Forward
◀ : Reverse
◀◀ : Rewind
no mark: stop

[ ]: Voltages taken from the indicated points to the ground of servo amplifier circuit in forward mode.

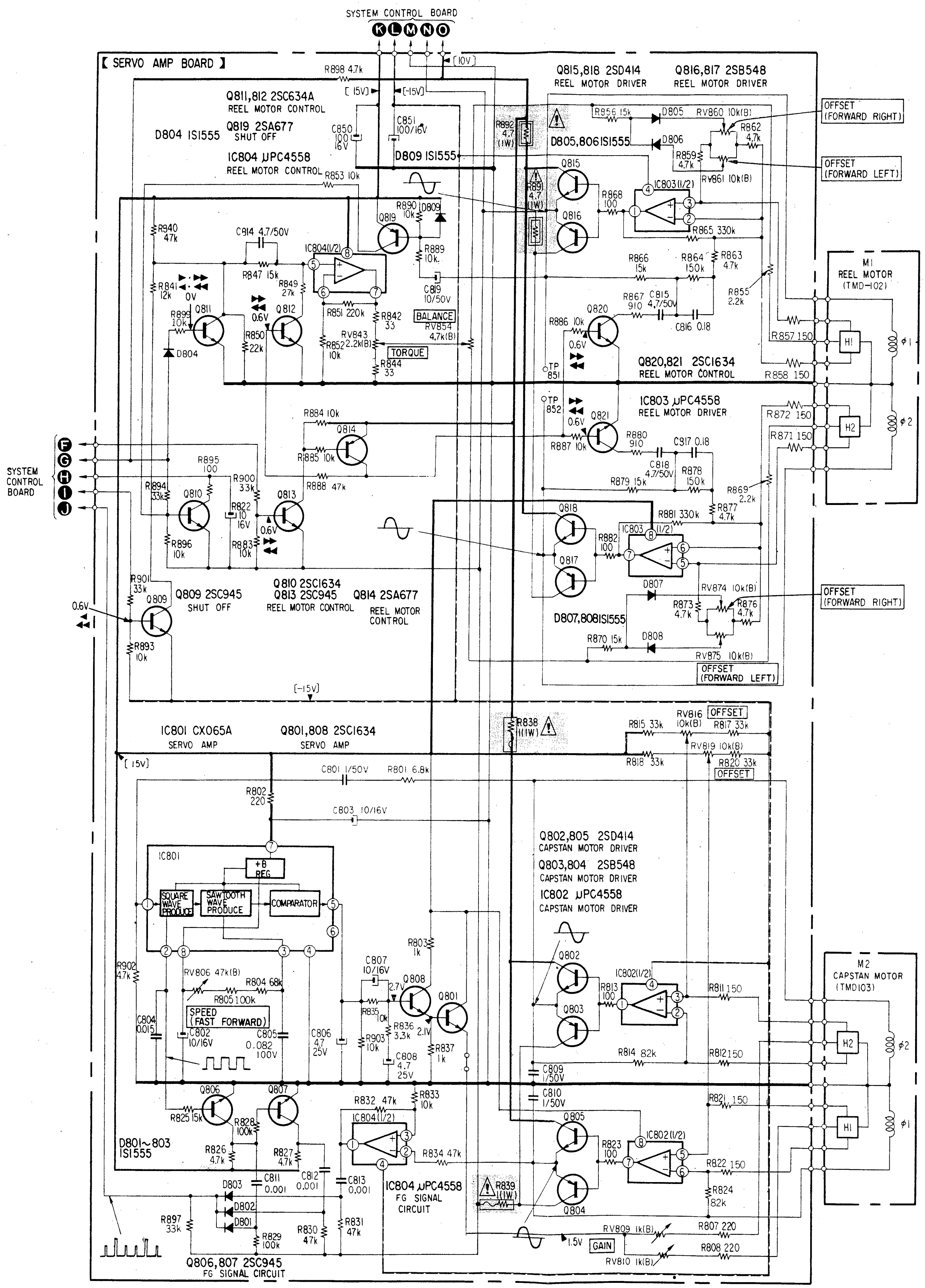
Note:

(The ground of servo amplifier circuit is isolated from the chassis ground which has zero potential. The difference in voltage between these two grounds is approximately 10 V.)

- Voltage variations may be noted due to normal production tolerances.

Seite 21 Leer

4-1. SCHEMATIC DIAGRAM —Servo Amp Section—


SYSTEM CONTROL BOARD
K L M N O
SERVO AMP BOARD
Q811,812 2SC634A REEL MOTOR CONTROL
Q819 2SA677 SHUT OFF
D804 1S1555
IC804 μPC4558 REEL MOTOR CONTROL
D809 1S1555
Q815,818 2SD414 REEL MOTOR DRIVER
Q816,817 2SB548 REEL MOTOR DRIVER
D805,806 1S1555
IC803(1/2)
OFFSET (FORWARD RIGHT)
OFFSET (FORWARD LEFT)
M1 REEL MOTOR (TMD-102)
H1
H2
BALANCE
TORQUE
Q820,821 2SC1634 REEL MOTOR CONTROL
IC803 μPC4558 REEL MOTOR DRIVER
SYSTEM CONTROL BOARD
F G H I J
Q809 2SC945 SHUT OFF
Q810 2SC1634
Q813 2SC945 REEL MOTOR CONTROL
Q814 2SA677 REEL MOTOR CONTROL
D807,808 1S1555
IC801 CX065A SERVO AMP
Q801,808 2SC1634 SERVO AMP
OFFSET
IC801
+B REG
SQUARE WAVE PRODUCE
SAWTOOTH WAVE PRODUCE
COMPARATOR
SPEED (FAST FORWARD)
Q802,805 2SD414 CAPSTAN MOTOR DRIVER
Q803,804 2SB548 CAPSTAN MOTOR DRIVER
IC802 μPC4558 CAPSTAN MOTOR DRIVER
M2 CAPSTAN MOTOR (TMD103)
D801~803 1S1555
IC804 μPC4558 FG SIGNAL CIRCUIT
Q806,807 2SC945 FG SIGNAL CIRCUIT
GAIN
A
B
C
D

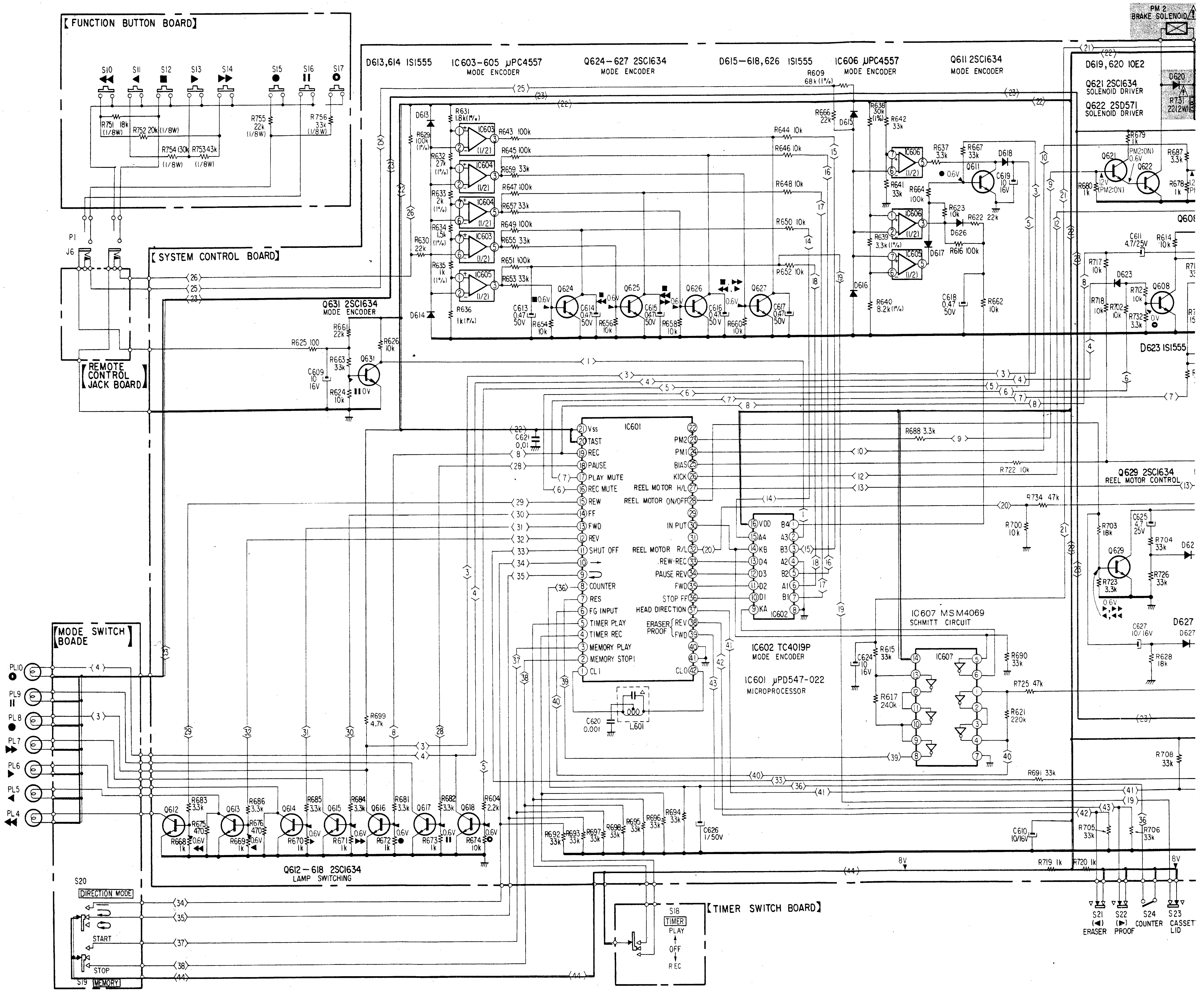
2-2. SCHEMATIC DIAGRAM —System Control Section—

- All capacitors are in μF unless otherwise noted. pF = $\mu\mu$F 50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ = 1000Ω, MΩ = 1000 kΩ
- ▭ : panel designation
- -▭- : nonflammable resistor.
- (N) : low-noise resistor.
- ━━ : B + bus.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).
  - ◀◀ : Rewind no mark: stop
  - ◀ : Reverse
  - ▶ : Forward
  - ▶▶ : Fast Forward
  - ● : record
  - ❚❚ : pause
  - ⦿ : rec mute
  - ■ : stop
- Voltage variations may be noted due to normal production tolerances.
- Switch

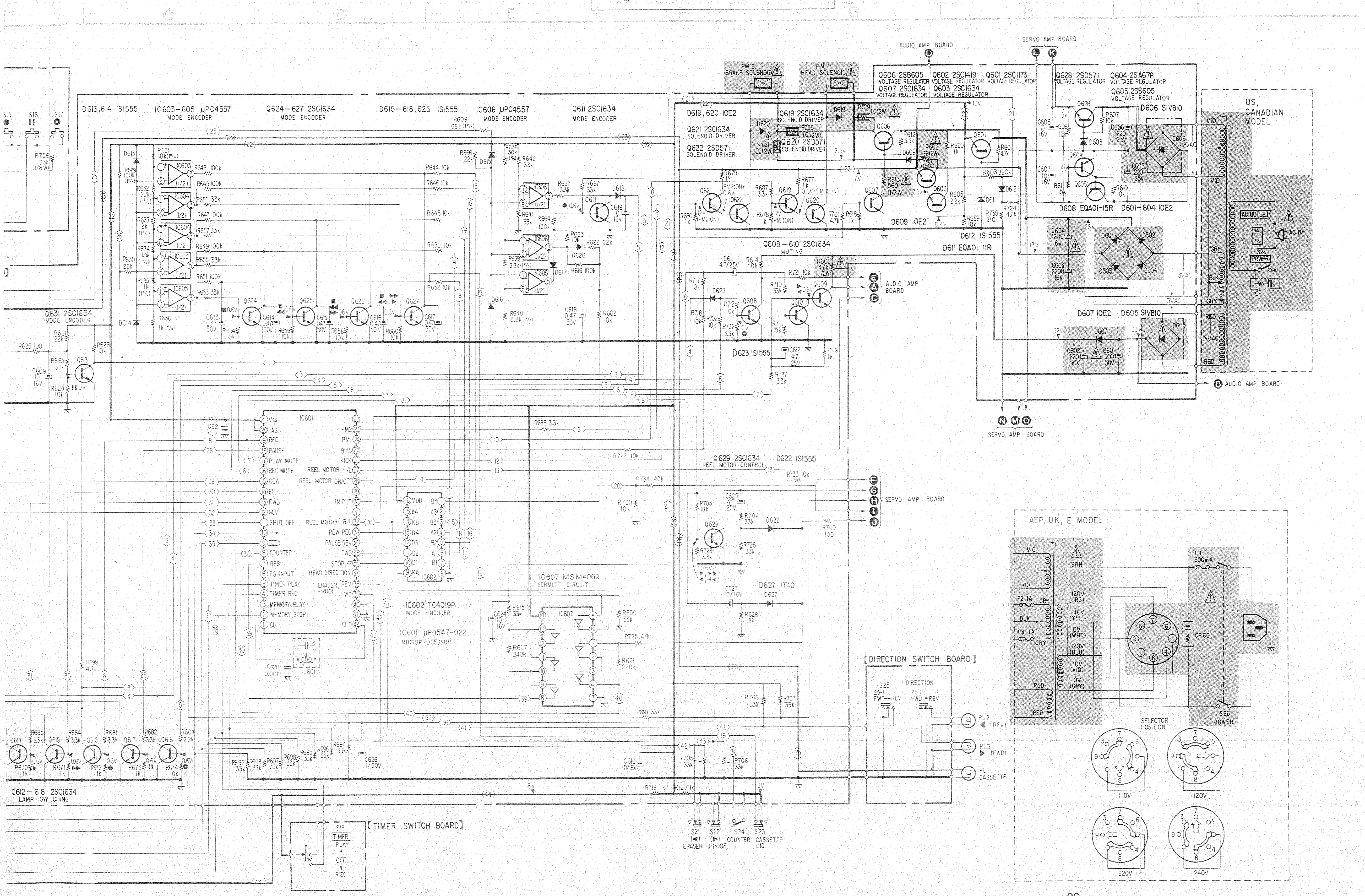
Ref. No.	Switch	Position
S10–15	FUNCTION	FORWARD
S16	PAUSE	OFF
S17	REC MUTE	OFF
S18	TIMER	OFF
S19	MEMORY	OFF
S20	DIRECTION MODE	↩
S21	REVERSE ERASER PROOF	OFF
S22	FORWARD ERASER PROOF	OFF
S23	CASSETTE LID	OFF
S24	TAPE COUNTER	OFF
S25	DIRECTION	FORWARD
S26	POWER	OFF

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un trame et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.



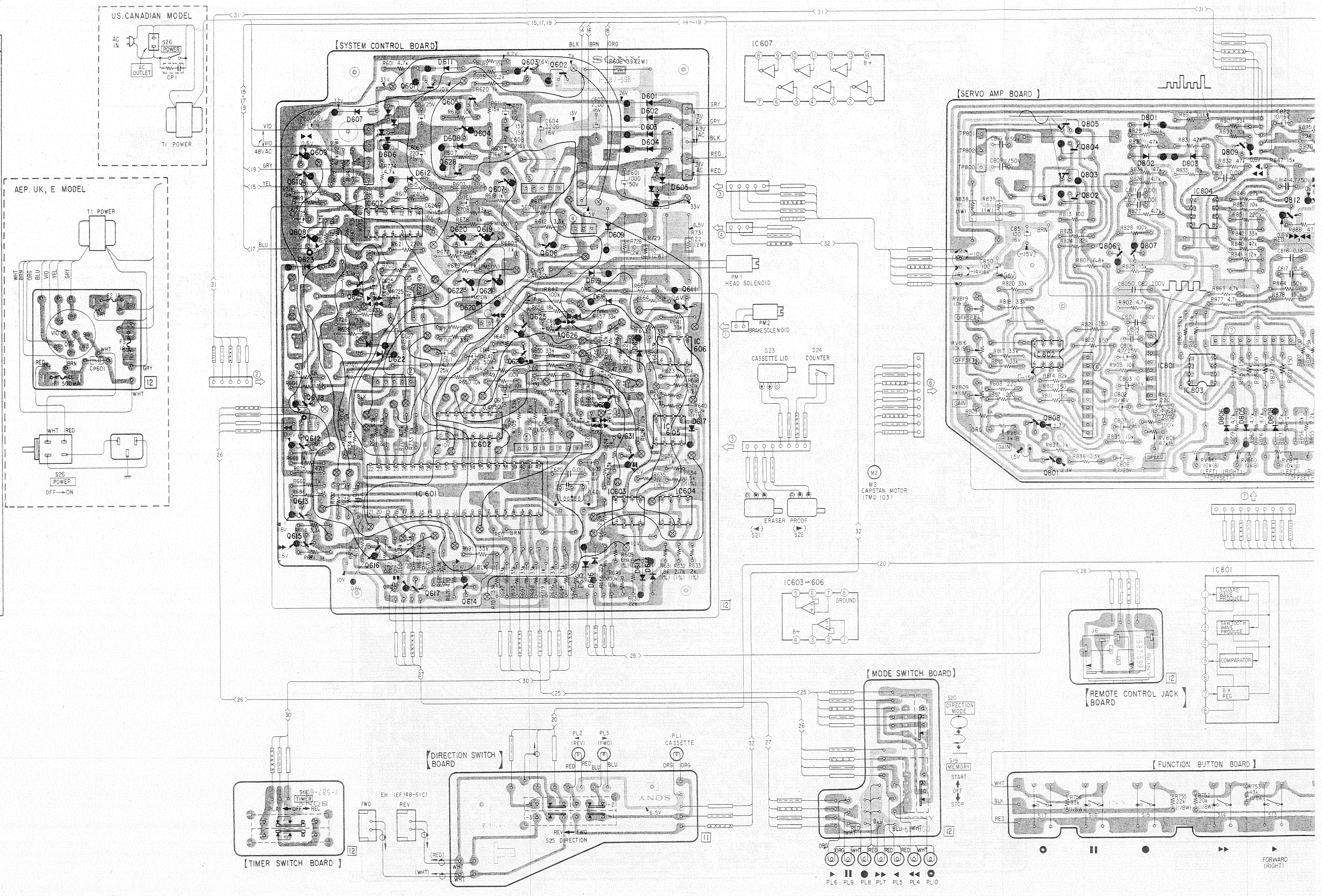
FUNCTION BUTTON BOARD
S10 S11 S12 S13 S14 S15 S16 S17
R751 18k (1/8W)
R752 20k (1/8W)
R754 130k (1/8W)
R753 43k (1/8W)
R755 22k (1/8W)
R756 33k (1/8W)
P1
J6
SYSTEM CONTROL BOARD
REMOTE CONTROL JACK BOARD
Q631 2SC1634 MODE ENCODER
MODE SWITCH BOADE
PL10 PL9 PL8 PL7 PL6 PL5 PL4
D613,614 1S1555
IC603–605 μPC4557 MODE ENCODER
Q624–627 2SC1634 MODE ENCODER
D615–618,626 1S1555
IC606 μPC4557 MODE ENCODER
Q611 2SC1634 MODE ENCODER
PM 2 BRAKE SOLENOID
D619,620 10E2
Q621 2SC1634 SOLENOID DRIVER
Q622 2SD571 SOLENOID DRIVER
D623 1S1555
Q629 2SC1634 REEL MOTOR CONTROL
IC601
IC601 μPD547-022 MICROPROCESSOR
IC602 TC4019P MODE ENCODER
IC607 MSM4069 SCHMITT CIRCUIT
L601
Q612–618 2SC1634 LAMP SWITCHING
S20 DIRECTION MODE
START
STOP
S19 MEMORY
S18 TIMER PLAY OFF REC
TIMER SWITCH BOARD
S21 (◀) ERASER
S22 (▶) PROOF
S24 COUNTER
S23 CASSETTE LID


AUDIO AMP BOARD
SERVO AMP BOARD
PM 2 BRAKE SOLENOID
PM 1 HEAD SOLENOID
Q606 2SB605 VOLTAGE REGULATOR
Q602 2SC1419 VOLTAGE REGULATOR
Q601 2SC1173 VOLTAGE REGULATOR
Q607 2SC1634 VOLTAGE REGULATOR
Q603 2SC1634 VOLTAGE REGULATOR
Q628 2SD571 VOLTAGE REGULATOR
Q604 2SA678 VOLTAGE REGULATOR
Q605 2SB605 VOLTAGE REGULATOR
D606 SIVB10
US, CANADIAN MODEL
D613,614 1S1555
IC603-605 μPC4557 MODE ENCODER
Q624-627 2SC1634 MODE ENCODER
D615-618,626 1S1555
IC606 μPC4557 MODE ENCODER
Q611 2SC1634 MODE ENCODER
D619,620 10E2
Q619 2SC1634 SOLENOID DRIVER
Q620 2SD571 SOLENOID DRIVER
Q621 2SC1634 SOLENOID DRIVER
Q622 2SD571 SOLENOID DRIVER
D608 EQA01-15R
D601-604 10E2
D609 10E2
D612 1S1555
D611 EQA01-11R
Q608-610 2SC1634 MUTING
AC OUTLET
AC IN
S26 POWER
CP1
D607 10E2
D605 SIVB10
Q631 2SC1634 MODE ENCODER
D623 1S1555
SERVO AMP BOARD
IC601
Q629 2SC1634 REEL MOTOR CONTROL
D622 1S1555
IC602 TC4019P MODE ENCODER
IC601 μPD547-022 MICROPROCESSOR
IC607 MSM4069 SCHMITT CIRCUIT
D627 1T40
AEP, UK, E MODEL
F1 500mA
CP601
SELECTOR POSITION
110V
120V
220V
240V
[DIRECTION SWITCH BOARD]
S25 DIRECTION
PL2 (REV)
PL3 (FWD)
PL1 CASSETTE
Q612-618 2SC1634 LAMP SWITCHING
[TIMER SWITCH BOARD]
S18 TIMER PLAY OFF REC
S21 ERASER
S22 PROOF
S24 COUNTER
S23 CASSETTE LID

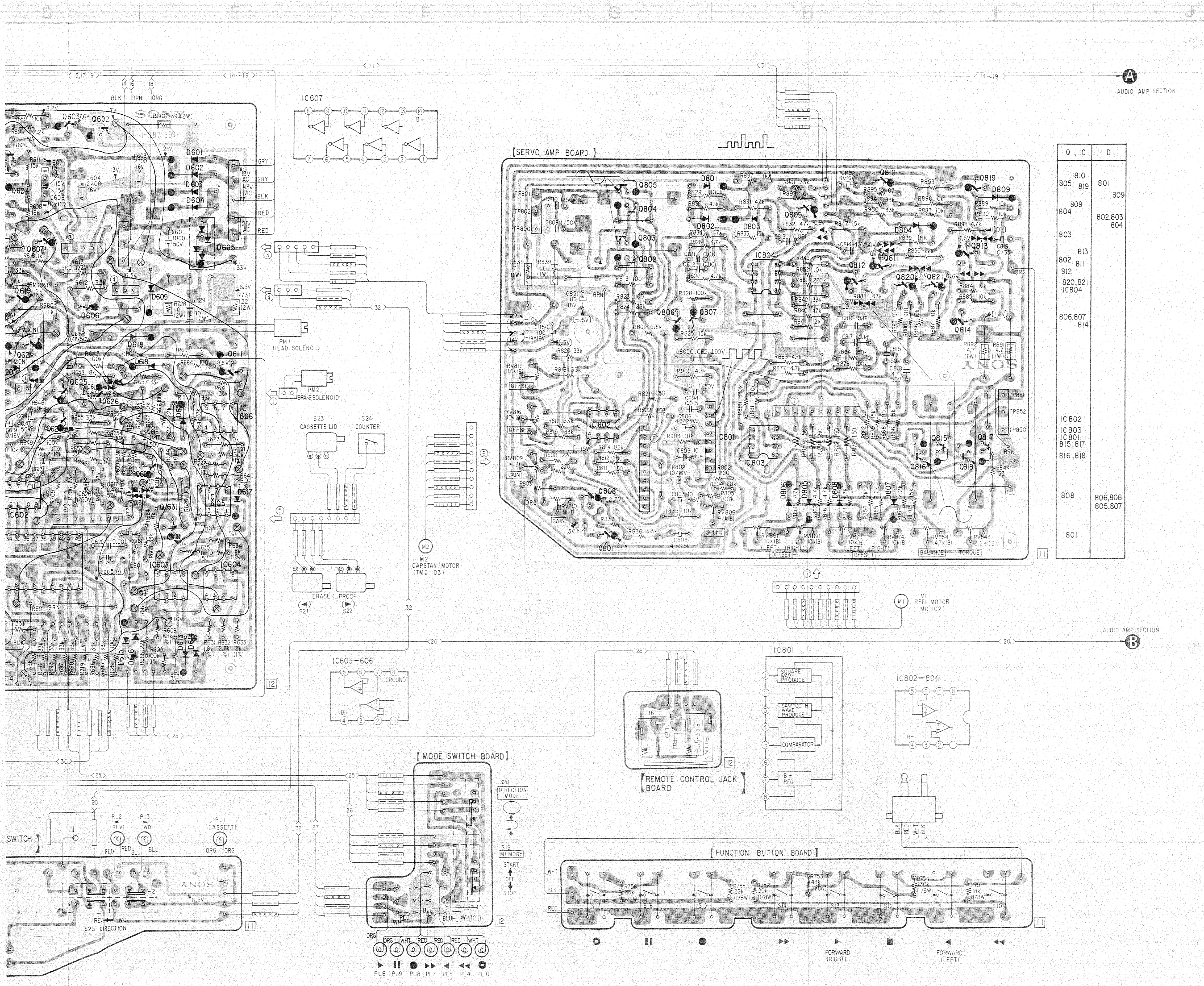
4-3. MOUNTING DIAGRAM –System Control Section–

–Conductor Side–

Q, IC	D
603, 602	611
601	
605	
	601
	607
604	606, 602
	603
	608, 604
609	
610, 628	612
607	605
IC607	
620, 619	609
608, 606	
	623, 619
622, 621, 629	
	620, 618
611	621
625, 626	
	626
624, IC606	627, 622
618, 627	
IC602, IC605	617
612	
631	
IC601	
IC603, IC604	
613	
615, 616	
	615, 616
	613, 614
614, 617	



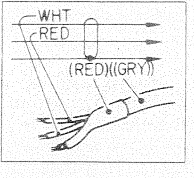
A
B
C
D
E
F
G
H
1
2
3
4
5
US. CANADIAN MODEL
AC IN
S26 POWER
AC OUTLET
CP1
T1 POWER
AEP. UK, E MODEL
T1 POWER
WHT
BRN
ORG
BLU
VIO
YEL
GRY
CP601
S26 POWER
OFF → ON
[SYSTEM CONTROL BOARD]
IC607
PM1 HEAD SOLENOID
PM2 BRAKE SOLENOID
S23 CASSETTE LID
S24 COUNTER
ERASER PROOF
S21
S22
M2 CAPSTAN MOTOR (TMD 103)
IC603–606
GROUND
B+
[SERVO AMP BOARD]
IC801
SQUARE WAVE PRODUCE
SAWTOOTH WAVE PRODUCE
COMPARATOR
B+ REG
[REMOTE CONTROL JACK BOARD]
J6
[MODE SWITCH BOARD]
S20 DIRECTION MODE
S19 MEMORY
START
OFF
STOP
[DIRECTION SWITCH BOARD]
PL2 (REV)
PL3 (FWD)
PL1 CASSETTE
S25 DIRECTION
EH (EF148-61C)
FWD
REV
[TIMER SWITCH BOARD]
S18 TIMER
PLAY
OFF
REV
[FUNCTION BUTTON BOARD]
FORWARD (RIGHT)
PL6
PL9
PL8
PL7
PL5
PL4
PL10


D
E
F
G
H
I
J
AUDIO AMP SECTION
IC607
[SERVO AMP BOARD]
PM1 HEAD SOLENOID
PM2 BRAKE SOLENOID
S23 CASSETTE LID
S24 COUNTER
M2 CAPSTAN MOTOR (TMD 103)
M1 REEL MOTOR (TMD 102)
ERASER PROOF
S21
S22
IC603–606
GROUND
IC801
SQUARE WAVE PRODUCE
SAW TOOTH WAVE PRODUCE
COMPARATOR
B+ REG
IC802–804
[REMOTE CONTROL JACK BOARD]
[MODE SWITCH BOARD]
S20 DIRECTION MODE
S19 MEMORY
START
OFF
STOP
[FUNCTION BUTTON BOARD]
FORWARD (RIGHT)
FORWARD (LEFT)
PL2 (REV)
PL3 (FWD)
PL1 CASSETTE
S25 DIRECTION
SWITCH
PL6 PL9 PL8 PL7 PL5 PL4 PL10
P1
OFFSET
GAIN
SPEED
BALANCE
TORQUE

Q, IC	D
810 805 819	801 809
809 804	802,803 804
803	
813 802 811 812	
820,821 IC804	
806,807 814	
IC802	
IC803 IC801 815,817	
816,818	
808	806,808 805,807
801	

Replacement Semiconductors: See page 22.

- Color code of sleeving over the end of the jacket.


WHT
RED
(RED)((GRY))

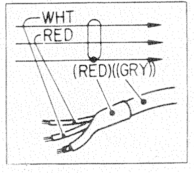
- ○—: parts extracted from the component side.
- ●—: parts extracted from the conductor side.
- ⊗ : Through hole.
- ⊗—⊗ : component-side pattern
- ▨ : B + (high) pattern
- ▨ : B + (low) pattern
- ▨ : B – pattern

4-4. MOUNTING DIAGRAM –Audio Amp Section–

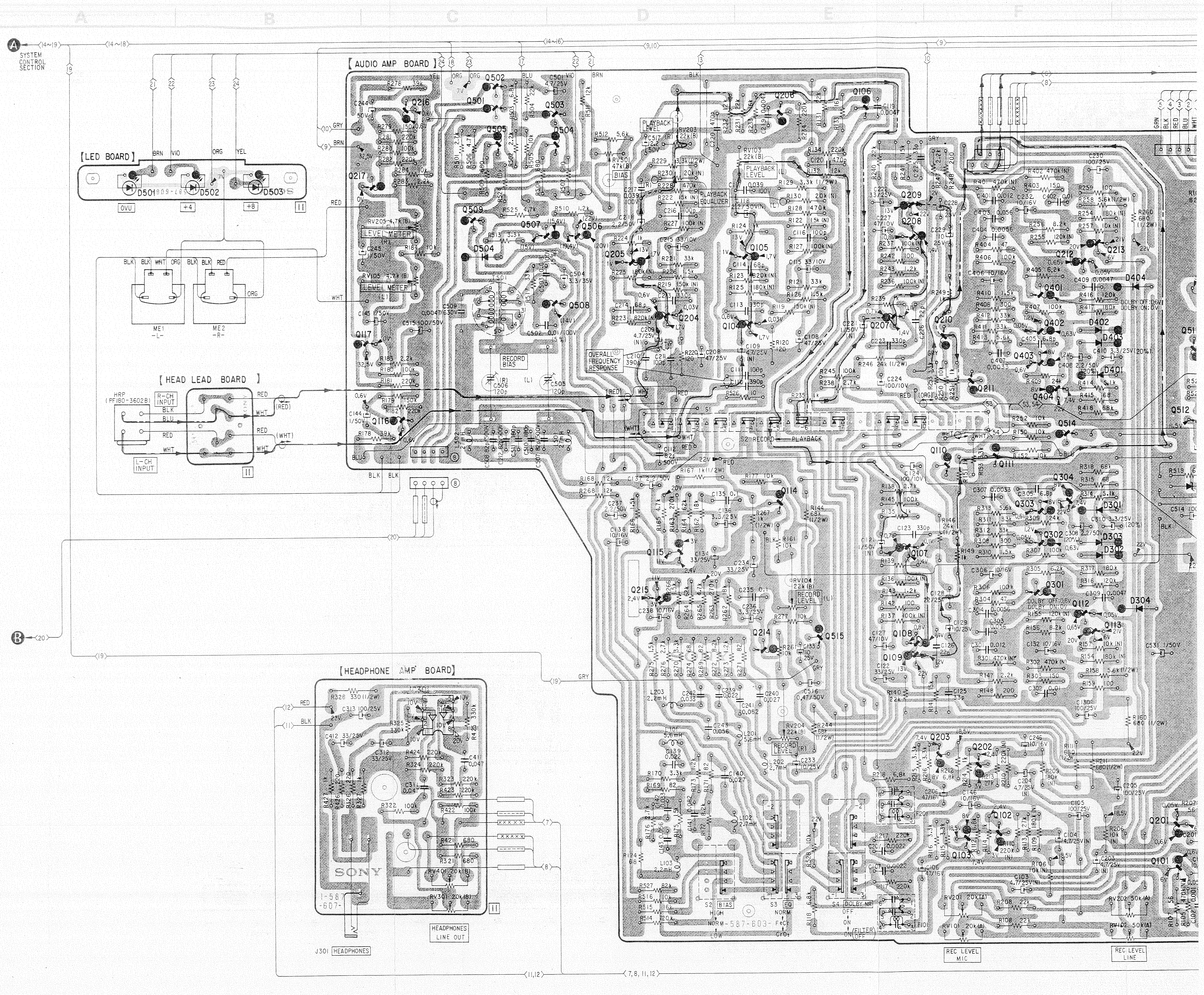
–Conductor Side–

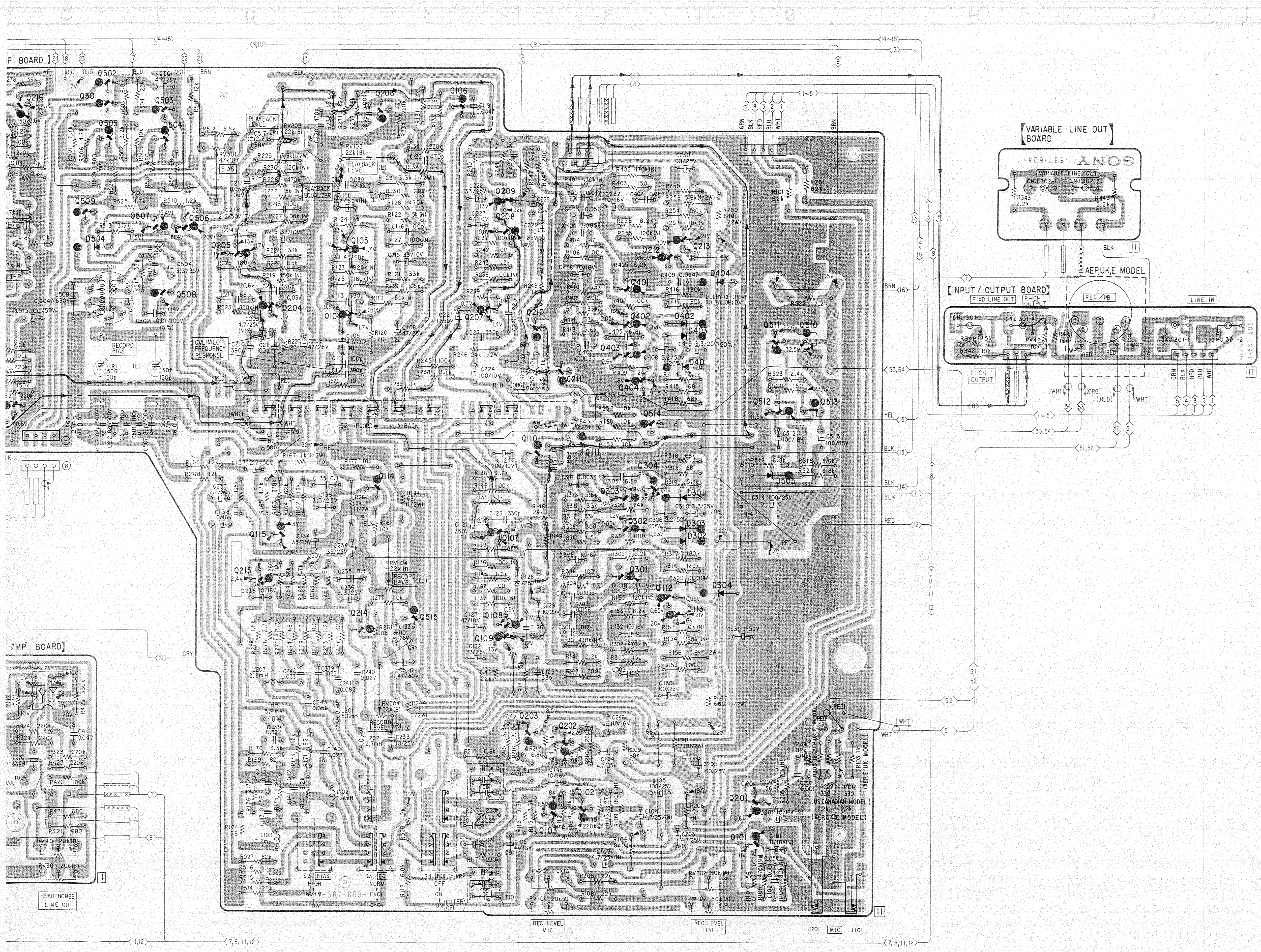
- **Replacement Semiconductors: See Page 35.**

- Color code of sleeving over the end of the jacket.


WHT
RED
(RED)((GRY))

- ○— : parts extracted from the component side.
- ●— : parts extracted from the conductor side.
- Signal Path
  - —·—▶ : L-CH
  - —··—▶ : R-CH
  - ▨ : B + (high) pattern
  - ▨ : B + (low) pattern


A
B
C
D
E
F
SYSTEM CONTROL SECTION
AUDIO AMP BOARD
LED BOARD
HEAD LEAD BOARD
HEADPHONE AMP BOARD
R-CH INPUT
L-CH INPUT
HEADPHONES LINE OUT
J301 HEADPHONES
REC LEVEL MIC
REC LEVEL LINE
PLAYBACK LEVEL
PLAYBACK EQUALIZER
RECORD BIAS
OVERALL FREQUENCY RESPONSE
RECORD LEVEL
LEVEL METER
S2 RECORD–PLAYBACK
S2 BIAS
S3 EQ
S4 DOLBY NR
SONY

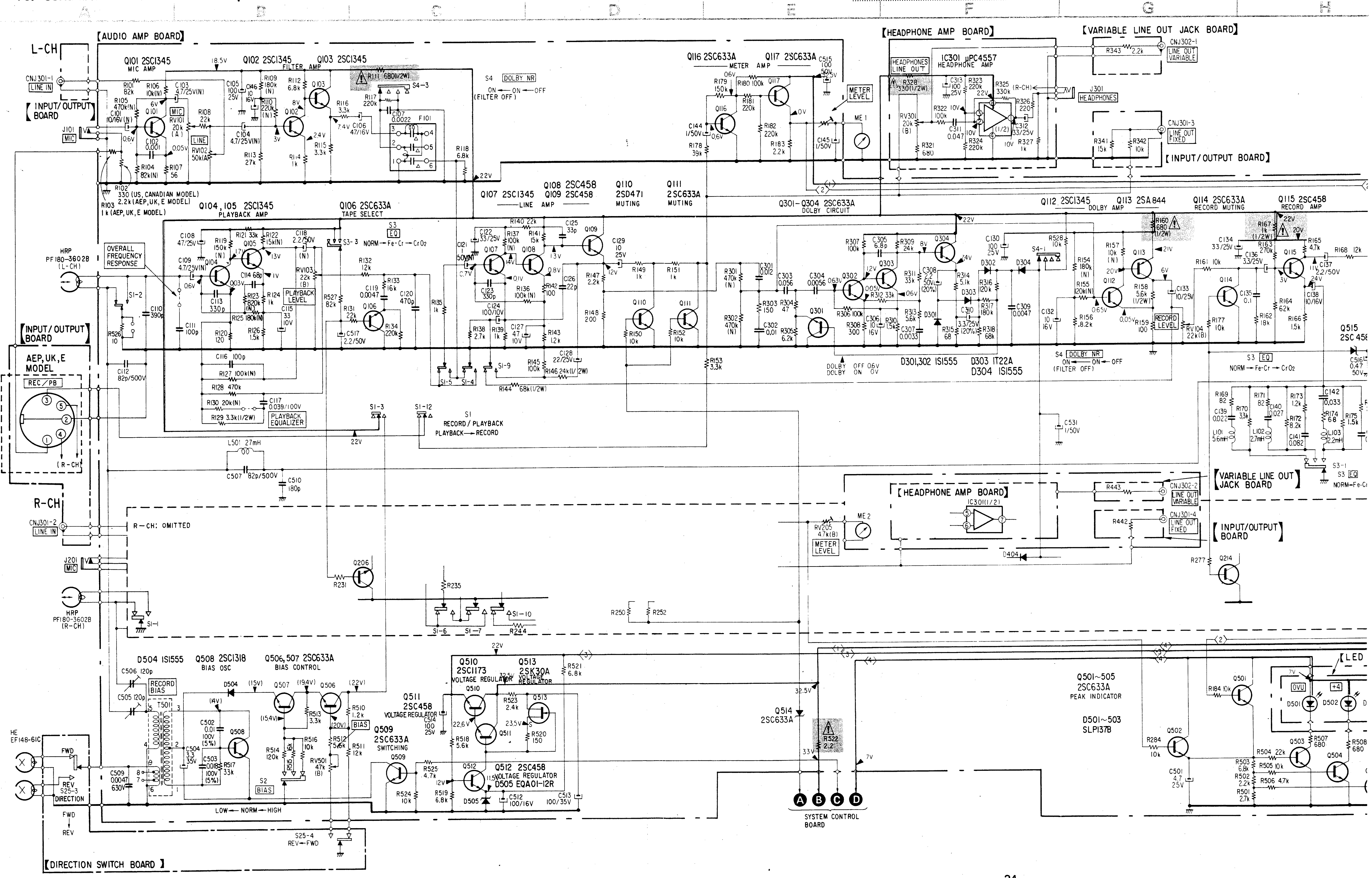

C
D
E
F
G
H
I
J
P BOARD
AMP BOARD
PLAYBACK LEVEL
PLAYBACK EQUALIZER
BIAS
RECORD BIAS
OVERALL FREQUENCY RESPONSE
RECORD LEVEL
RECORD
PLAYBACK
VARIABLE LINE OUT BOARD
SONY 1-587-604-
VARIABLE LINE OUT
AEP,UK,E MODEL
INPUT / OUTPUT BOARD
FIXD LINE OUT
R-CH OUTPUT
REC/PB
LINE IN
L-CH OUTPUT
1-587-605-
HEADPHONES LINE OUT
REC LEVEL MIC
REC LEVEL LINE
J201
MIC
J101
S2 BIAS
HIGH
NORM
LOW
S3 EQ
S4 DOLBY NR
OFF
ON
(FILTER)
1-587-603-
DOLBY OFF 0.6V
DOLBY ON 0V
(US,CANADIAN MODEL)
(AEP,UK,E MODEL)
BRN
BLK
RED
YEL
WHT
GRN
BLU
ORG
GRY

Q, IC	D
502	
216 501 206 106 503	
505,504	501 ~503
217	
209	
509 507,506 208	
105 213 205	504
212	
401	404
508	
204 207	
104 402 210	402 403
117 511,510	
403	
211	401
404	
116 512,513	
514	
111 110	
	505
114 304 303	301
302	
115 107	303 302
215 301	
	304
112	
515 113 214 108	
109	
IC301	
203 202	
201 102 103	
101	
Q, IC	D

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

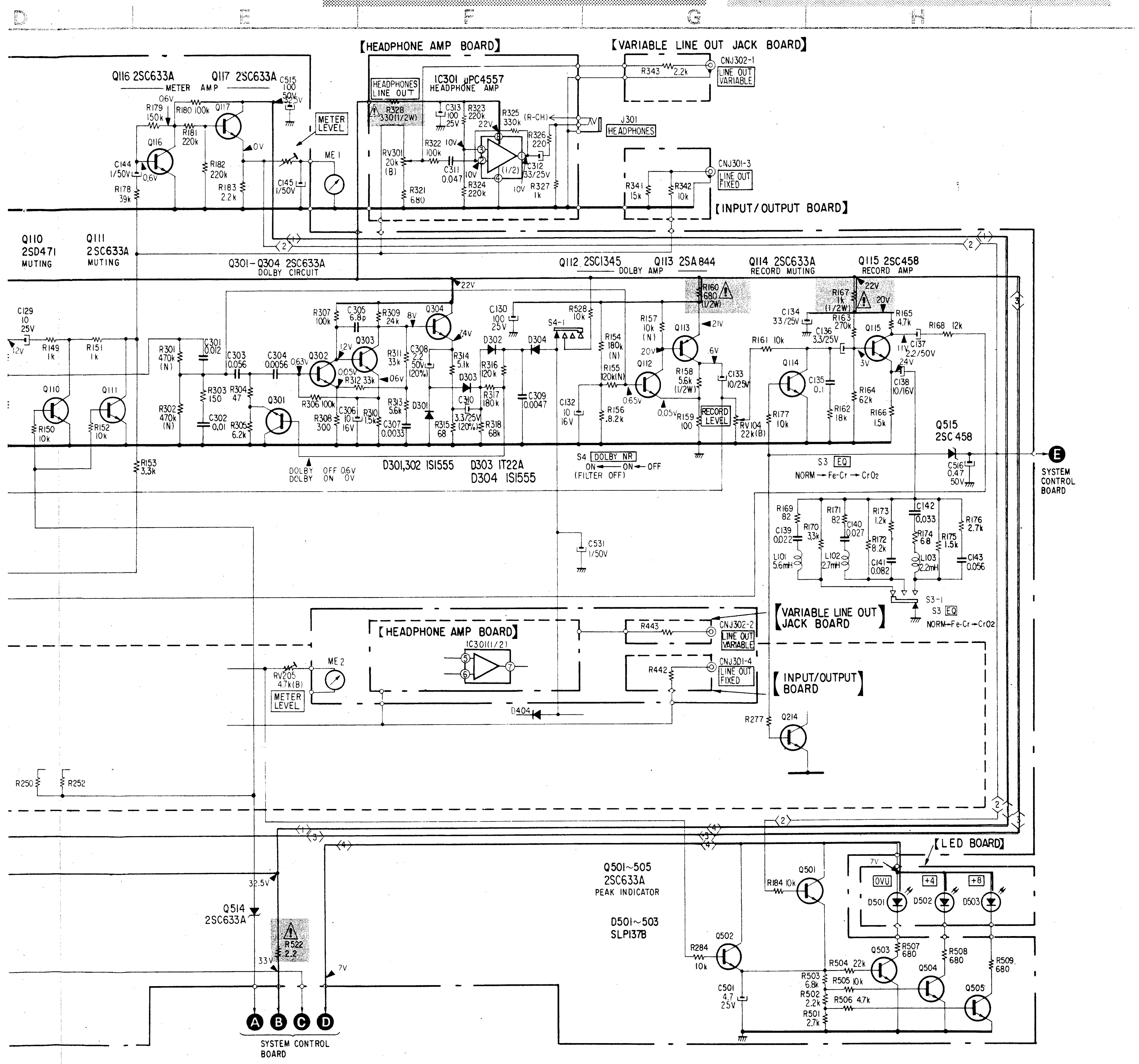
Note: Les composants identifiés pa
marque ⚠ sont critiques pour
remplacer que par une pièce
spécifié.

4-5. SCHEMATIC DIAGRAM —Audio Amp Section—


A
B
C
D
E
F
G
H
L-CH
[AUDIO AMP BOARD]
Q101 2SC1345 MIC AMP
Q102 2SC1345 FILTER AMP
Q103 2SC1345
CNJ301-1 LINE IN
[INPUT/OUTPUT BOARD]
J101 MIC
R111 680(1/2W)
S4 DOLBY NR ON ← ON → OFF (FILTER OFF)
S4-3
F101
22V
R102 330 (US, CANADIAN MODEL) 2.2k (AEP, UK, E MODEL)
R103 1k (AEP, UK, E MODEL)
Q104, 105 2SC1345 PLAYBACK AMP
Q106 2SC633A TAPE SELECT
Q107 2SC1345 LINE AMP
Q108 2SC458
Q109 2SC458
Q110 2SD471 MUTING
Q111 2SC633A MUTING
Q116 2SC633A METER AMP
Q117 2SC633A
METER LEVEL
ME1
[HEADPHONE AMP BOARD]
HEADPHONES LINE OUT
IC301 μPC4557 HEADPHONE AMP
R328 330(1/2W)
J301 HEADPHONES
[VARIABLE LINE OUT JACK BOARD]
CNJ302-1 LINE OUT VARIABLE
CNJ301-3 LINE OUT FIXED
[INPUT/OUTPUT BOARD]
Q301-Q304 2SC633A DOLBY CIRCUIT
Q112 2SC1345 DOLBY AMP
Q113 2SA844
Q114 2SC633A RECORD MUTING
Q115 2SC458 RECORD AMP
R160 680 (1/2W)
R167 1k (1/2W)
HRP PF180-3602B (L-CH)
OVERALL FREQUENCY RESPONSE
PLAYBACK LEVEL
PLAYBACK EQUALIZER
S3 EQ NORM → Fe-Cr → CrO2
S1-2
AEP, UK, E MODEL
REC/PB
(R-CH)
S1-3
S1-12
S1 RECORD/PLAYBACK PLAYBACK → RECORD
S1-4
S1-5
S1-9
DOLBY OFF ON
D301, 302 1S1555
D303 1T22A
D304 1S1555
S4 DOLBY NR ON → ON → OFF (FILTER OFF)
RECORD LEVEL
Q515 2SC458
L501 27mH
C507 82p/500V
C510 180p
R-CH
CNJ301-2 LINE IN
R-CH: OMITTED
J201 MIC
HRP PF180-3602B (R-CH)
S1-1
Q206
S1-6
S1-7
S1-10
[HEADPHONE AMP BOARD]
IC301 (1/2)
ME2
RV205 4.7k (B)
METER LEVEL
D404
[VARIABLE LINE OUT JACK BOARD]
CNJ302-2 LINE OUT VARIABLE
CNJ301-4 LINE OUT FIXED
[INPUT/OUTPUT BOARD]
Q214
S3-1 S3 EQ NORM-Fe-Cr
D504 1S1555
Q508 2SC1318 BIAS OSC
Q506, 507 2SC633A BIAS CONTROL
RECORD BIAS
T501
Q510 2SC1173 VOLTAGE REGULATOR
Q513 2SK30A VOLTAGE REGULATOR
Q511 2SC458 VOLTAGE REGULATOR
Q509 2SC633A SWITCHING
Q512 2SC458 VOLTAGE REGULATOR
D505 EQA01-12R
S2 BIAS LOW ← NORM → HIGH
HE EF148-61C
FWD
REV
S25-3 DIRECTION
S25-4 REV ← FWD
[DIRECTION SWITCH BOARD]
Q514 2SC633A
R522 2.2
A
B
C
D
SYSTEM CONTROL BOARD
Q501~505 2SC633A PEAK INDICATOR
D501~503 SLP137B
LED
OVU
+4

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

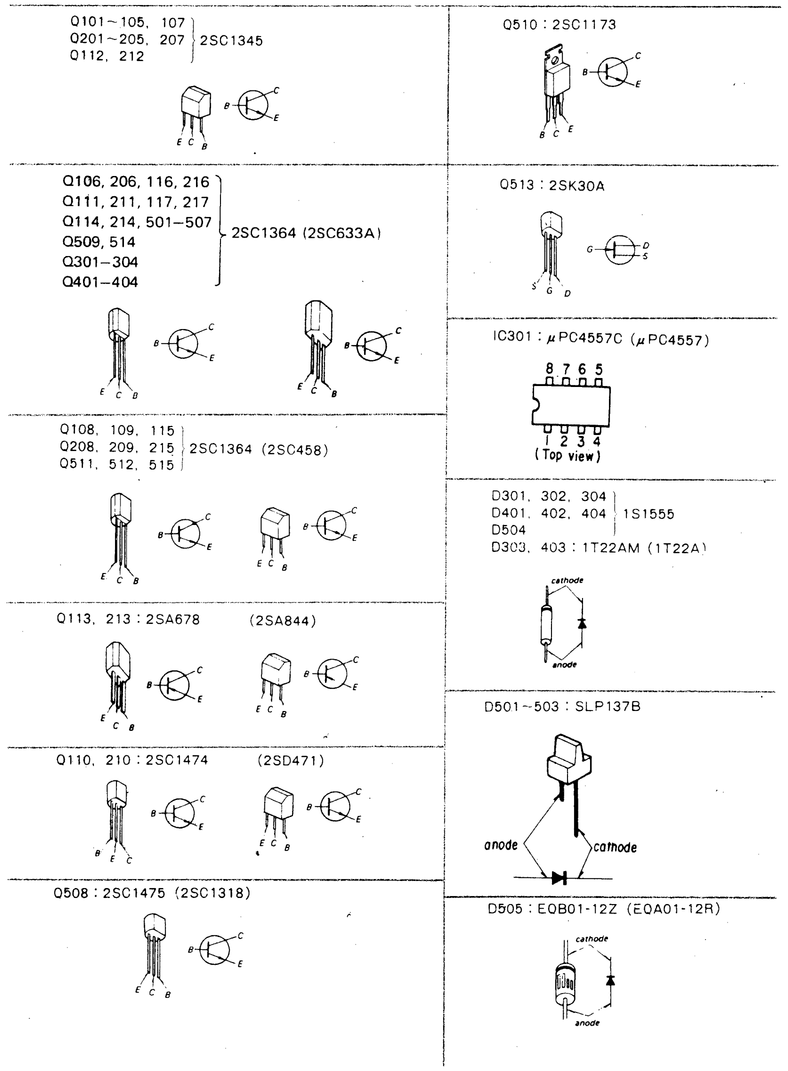
Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.


D
E
F
G
H
【HEADPHONE AMP BOARD】
【VARIABLE LINE OUT JACK BOARD】
【INPUT/OUTPUT BOARD】
Q116 2SC633A
Q117 2SC633A
METER AMP
IC301 μPC4557
HEADPHONE AMP
HEADPHONES LINE OUT
METER LEVEL
ME1
J301 HEADPHONES
CNJ302-1 LINE OUT VARIABLE
CNJ301-3 LINE OUT FIXED
Q110 2SD471 MUTING
Q111 2SC633A MUTING
Q301–Q304 2SC633A DOLBY CIRCUIT
Q112 2SC1345
Q113 2SA844
DOLBY AMP
Q114 2SC633A RECORD MUTING
Q115 2SC458 RECORD AMP
R160 680 (1/2W)
R167 1k (1/2W)
RECORD LEVEL
RV104 22k(B)
Q515 2SC458
S4 DOLBY NR
ON ← ON ← OFF
(FILTER OFF)
S3 EQ
NORM ← Fe-Cr → CrO2
D301,302 1S1555
D303 1T22A
D304 1S1555
DOLBY OFF 0.6V
DOLBY ON 0V
SYSTEM CONTROL BOARD
【HEADPHONE AMP BOARD】
IC301(1/2)
【VARIABLE LINE OUT JACK BOARD】
CNJ302-2 LINE OUT VARIABLE
【INPUT/OUTPUT BOARD】
CNJ301-4 LINE OUT FIXED
ME2
RV205 4.7k(B)
METER LEVEL
D404
Q214
【LED BOARD】
0VU
+4
+8
D501
D502
D503
Q501~505
2SC633A
PEAK INDICATOR
D501~503
SLP137B
Q514 2SC633A
R522 2.2
A
B
C
D
E
SYSTEM CONTROL BOARD

- All capacitors are in μF unless otherwise noted. pF = μμF 50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ = 1000Ω, MΩ = 1000 kΩ
- (N) : low-noise resistor.
- ▬▬ : B + bus.
- ▭ : panel designation.
- ▭ : adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).
  ( ): record
  no mark: stop
- Voltage variations may be noted due to normal production tolerances.
- Switch

Ref. No.	Switch	Position
S1	RECORD/PLAYBACK	PLAYBACK
S2	BIAS	HIGH
S3	EQ	NORM
S4	DOLBY NR	OFF

- **Replacement Semiconductors**
  For replacement, use semiconductors except in ( ).


Q101~105, 107 / Q201~205, 207 / Q112, 212 : 2SC1345

Q106, 206, 116, 216 / Q111, 211, 117, 217 / Q114, 214, 501–507 / Q509, 514 / Q301–304 / Q401–404 : 2SC1364 (2SC633A)

Q108, 109, 115 / Q208, 209, 215 / Q511, 512, 515 : 2SC1364 (2SC458)

Q113, 213 : 2SA678 (2SA844)

Q110, 210 : 2SC1474 (2SD471)

Q508 : 2SC1475 (2SC1318)

Q510 : 2SC1173

Q513 : 2SK30A

IC301 : μPC4557C (μPC4557)

D301, 302, 304 / D401, 402, 404 / D504 : 1S1555

D303, 403 : 1T22AM (1T22A)

D501~503 : SLP137B

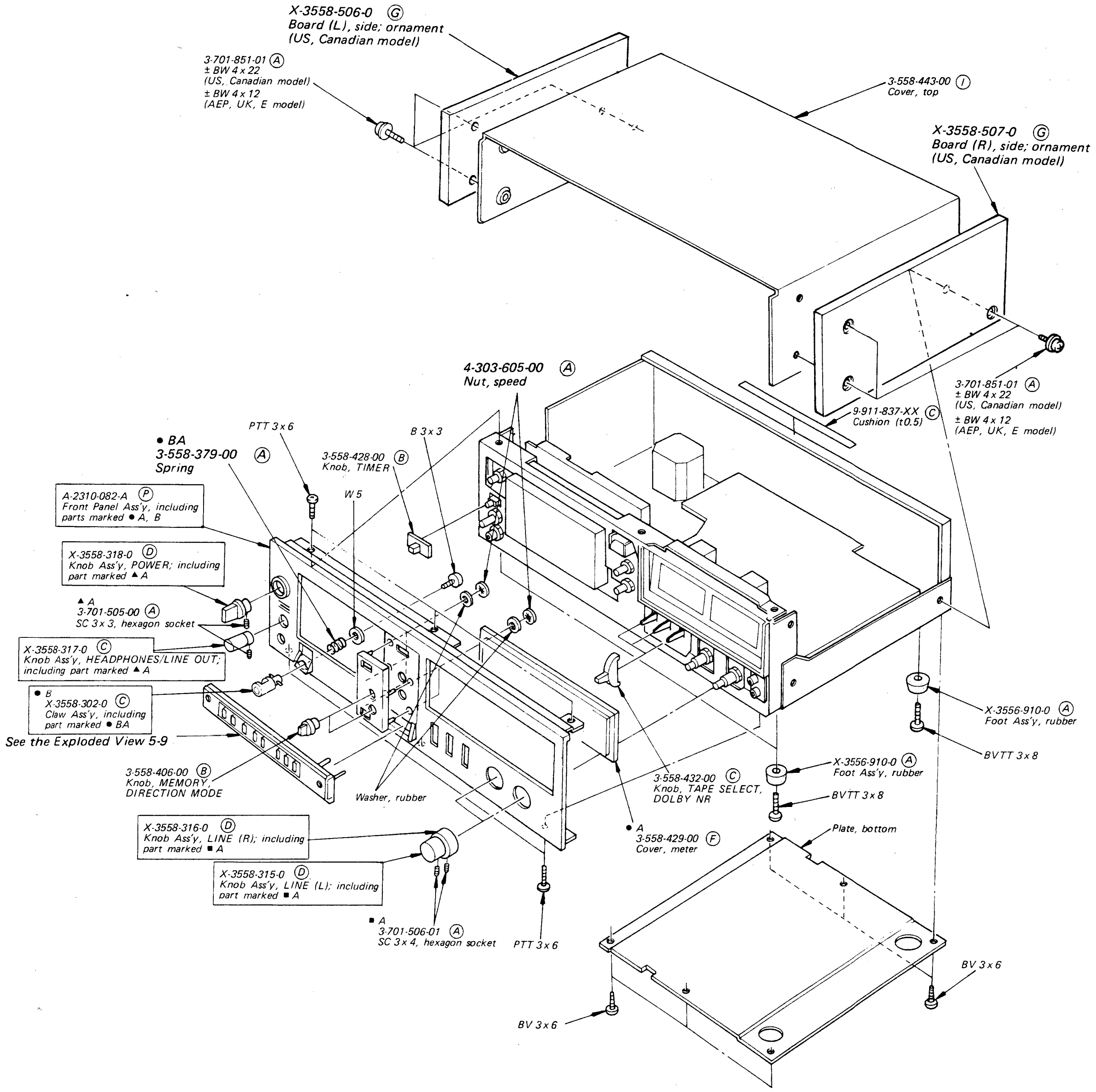
D505 : EQB01-12Z (EQA01-12R)
E C B
B C E
S G D
G D S
8 7 6 5
1 2 3 4
(Top view)
cathode
anode
B E C

SECTION 5
EXPLODED VIEWS

A B C D E F G H

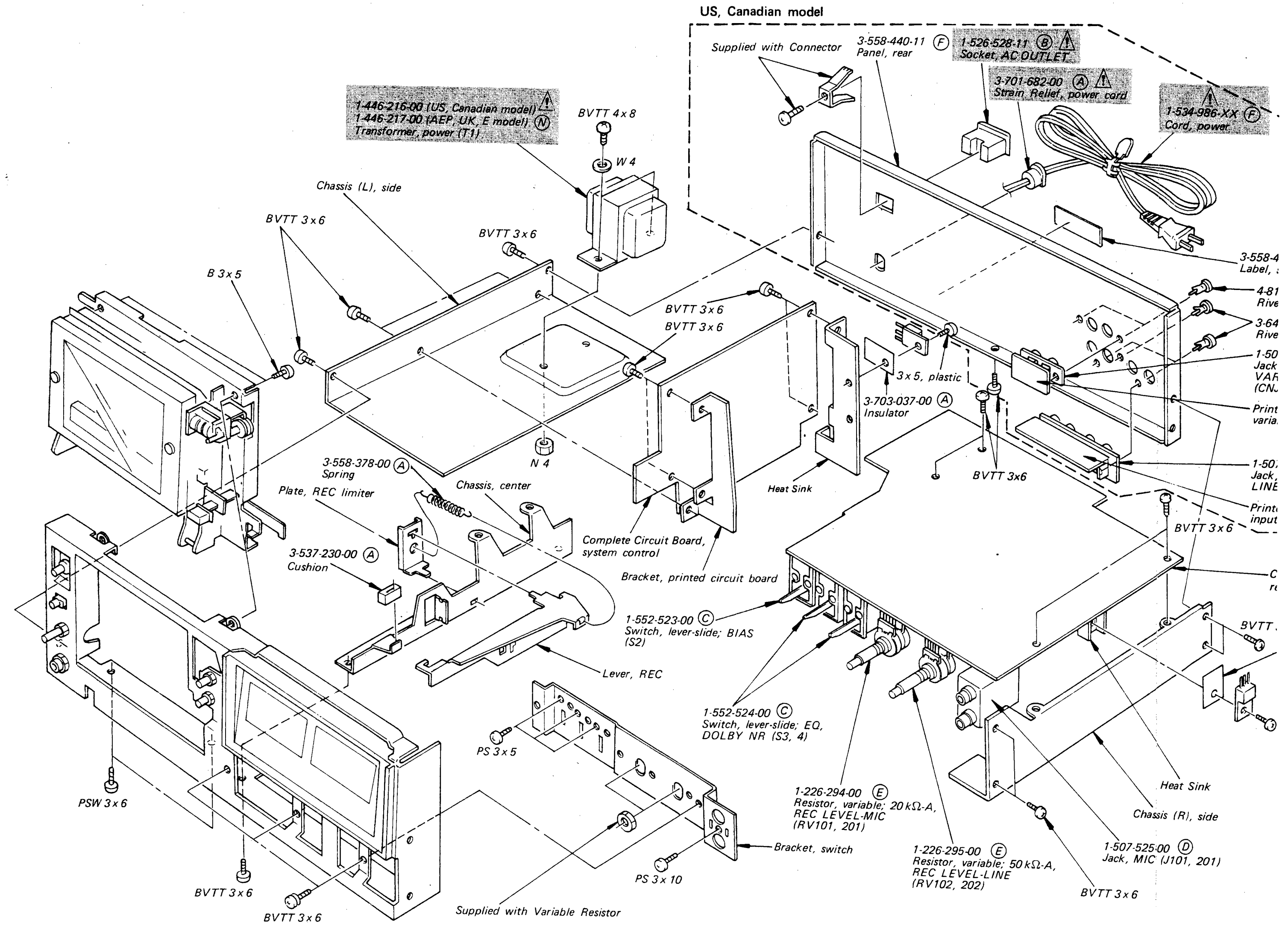
1 2 3 4 5

5-1.


X-3558-506-0 Ⓖ
Board (L), side; ornament
(US, Canadian model)
3-701-851-01 Ⓐ
± BW 4 x 22
(US, Canadian model)
± BW 4 x 12
(AEP, UK, E model)
3-558-443-00 Ⓘ
Cover, top
X-3558-507-0 Ⓖ
Board (R), side; ornament
(US, Canadian model)
4-303-605-00 Ⓐ
Nut, speed
9-911-837-XX Ⓒ
Cushion (t0.5)
3-701-851-01 Ⓐ
± BW 4 x 22
(US, Canadian model)
± BW 4 x 12
(AEP, UK, E model)
● BA
3-558-379-00 Ⓐ
Spring
PTT 3 x 6
B 3 x 3
3-558-428-00 Ⓑ
Knob, TIMER
W 5
A-2310-082-A Ⓟ
Front Panel Ass'y, including parts marked ● A, B
X-3558-318-0 Ⓓ
Knob Ass'y, POWER; including part marked ▲ A
▲ A
3-701-505-00 Ⓐ
SC 3 x 3, hexagon socket
X-3558-317-0 Ⓒ
Knob Ass'y, HEADPHONES/LINE OUT; including part marked ▲ A
● B
X-3558-302-0 Ⓒ
Claw Ass'y, including part marked ● BA
See the Exploded View 5-9
3-558-406-00 Ⓑ
Knob, MEMORY, DIRECTION MODE
Washer, rubber
3-558-432-00 Ⓒ
Knob, TAPE SELECT, DOLBY NR
● A
3-558-429-00 Ⓕ
Cover, meter
X-3556-910-0 Ⓐ
Foot Ass'y, rubber
BVTT 3 x 8
X-3556-910-0 Ⓐ
Foot Ass'y, rubber
BVTT 3 x 8
Plate, bottom
X-3558-316-0 Ⓓ
Knob Ass'y, LINE (R); including part marked ■ A
X-3558-315-0 Ⓓ
Knob Ass'y, LINE (L); including part marked ■ A
■ A
3-701-506-01 Ⓐ
SC 3 x 4, hexagon socket
PTT 3 x 6
BV 3 x 6
BV 3 x 6

Note:
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

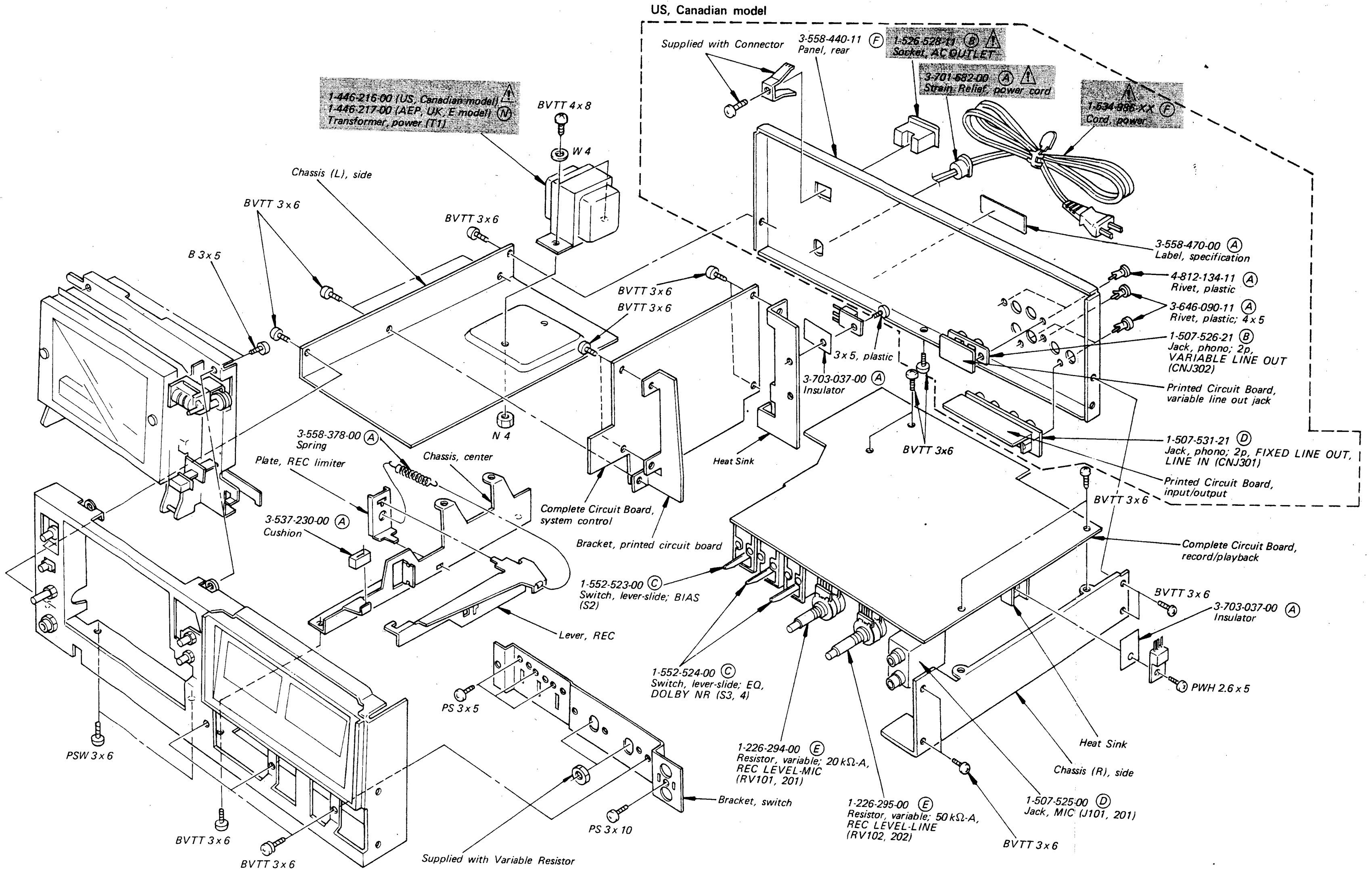
5-2.

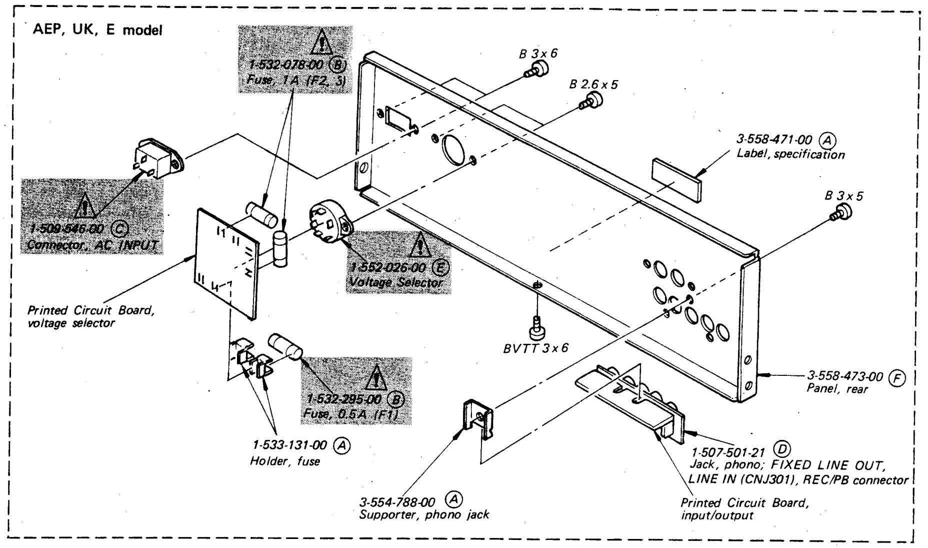

US, Canadian model
Supplied with Connector
3-558-440-11 Ⓕ
Panel, rear
1-526-528-11 Ⓑ ⚠
Socket, AC OUTLET
3-701-682-00 Ⓐ ⚠
Strain Relief, power cord
⚠
1-534-986-XX Ⓕ
Cord, power
1-446-216-00 (US, Canadian model) ⚠
1-446-217-00 (AEP, UK, E model) Ⓝ
Transformer, power (T1)
BVTT 4 x 8
W 4
Chassis (L), side
BVTT 3 x 6
BVTT 3 x 6
B 3 x 5
BVTT 3 x 6
BVTT 3 x 6
3-558-4
Label, :
4-81
Rive
3-64
Rive
1-50
Jack
VAF
(CN
3 x 5, plastic
3-703-037-00 Ⓐ
Insulator
Print
varia
N 4
Heat Sink
BVTT 3x6
1-50
Jack,
LINE
Print
input
BVTT 3 x 6
3-558-378-00 Ⓐ
Spring
Plate, REC limiter
Chassis, center
3-537-230-00 Ⓐ
Cushion
Complete Circuit Board, system control
Bracket, printed circuit board
C
re
1-552-523-00 Ⓒ
Switch, lever-slide; BIAS (S2)
BVTT
Lever, REC
1-552-524-00 Ⓒ
Switch, lever-slide; EQ, DOLBY NR (S3, 4)
PS 3 x 5
Heat Sink
PSW 3 x 6
1-226-294-00 Ⓔ
Resistor, variable; 20 kΩ-A, REC LEVEL-MIC (RV101, 201)
Chassis (R), side
Bracket, switch
1-226-295-00 Ⓔ
Resistor, variable; 50 kΩ-A, REC LEVEL-LINE (RV102, 202)
1-507-525-00 Ⓓ
Jack, MIC (J101, 201)
PS 3 x 10
BVTT 3 x 6
BVTT 3 x 6
BVTT 3 x 6
Supplied with Variable Resistor

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identi
marque ⚠ sont critique
remplacer que par une
spécifié.

5-2.


US, Canadian model
Supplied with Connector
3-558-440-11 Ⓕ
Panel, rear
1-526-528-11 Ⓑ ⚠
Socket, AC OUTLET
3-701-682-00 Ⓐ ⚠
Strain Relief, power cord
⚠ 1-534-886-XX Ⓕ
Cord, power
3-558-470-00 Ⓐ
Label, specification
4-812-134-11 Ⓐ
Rivet, plastic
3-646-090-11 Ⓐ
Rivet, plastic; 4 x 5
1-507-526-21 Ⓑ
Jack, phono; 2p, VARIABLE LINE OUT (CNJ302)
Printed Circuit Board, variable line out jack
1-507-531-21 Ⓓ
Jack, phono; 2p, FIXED LINE OUT, LINE IN (CNJ301)
Printed Circuit Board, input/output
BVTT 3 x 6
Complete Circuit Board, record/playback
1-446-216-00 (US, Canadian model) ⚠
1-446-217-00 (AEP, UK, E model) Ⓝ
Transformer, power (T1)
BVTT 4 x 8
W 4
Chassis (L), side
BVTT 3 x 6
BVTT 3 x 6
B 3 x 5
BVTT 3 x 6
BVTT 3 x 6
N 4
3 x 5, plastic
3-703-037-00 Ⓐ
Insulator
Heat Sink
BVTT 3x6
3-558-378-00 Ⓐ
Spring
Plate, REC limiter
Chassis, center
3-537-230-00 Ⓐ
Cushion
Complete Circuit Board, system control
Bracket, printed circuit board
1-552-523-00 Ⓒ
Switch, lever-slide; BIAS (S2)
Lever, REC
1-552-524-00 Ⓒ
Switch, lever-slide; EQ, DOLBY NR (S3, 4)
PS 3 x 5
PSW 3 x 6
1-226-294-00 Ⓔ
Resistor, variable; 20 kΩ-A, REC LEVEL-MIC (RV101, 201)
1-226-295-00 Ⓔ
Resistor, variable; 50 kΩ-A, REC LEVEL-LINE (RV102, 202)
Bracket, switch
PS 3 x 10
BVTT 3 x 6
BVTT 3 x 6
Supplied with Variable Resistor
BVTT 3 x 6
3-703-037-00 Ⓐ
Insulator
PWH 2.6 x 5
Heat Sink
Chassis (R), side
1-507-525-00 Ⓓ
Jack, MIC (J101, 201)
BVTT 3 x 6


AEP, UK, E model
⚠ 1-532-078-00 Ⓑ
Fuse, 1A (F2, 3)
B 3 x 6
B 2.6 x 5
3-558-471-00 Ⓐ
Label, specification
B 3 x 5
⚠ 1-509-546-00 Ⓒ
Connector, AC INPUT
⚠ 1-552-026-00 Ⓔ
Voltage Selector
Printed Circuit Board, voltage selector
BVTT 3 x 6
3-558-473-00 Ⓕ
Panel, rear
⚠ 1-532-295-00 Ⓑ
Fuse, 0.5A (F1)
1-533-131-00 Ⓐ
Holder, fuse
1-507-501-21 Ⓓ
Jack, phono; FIXED LINE OUT, LINE IN (CNJ301), REC/PB connector
3-554-788-00 Ⓐ
Supporter, phono jack
Printed Circuit Board, input/output

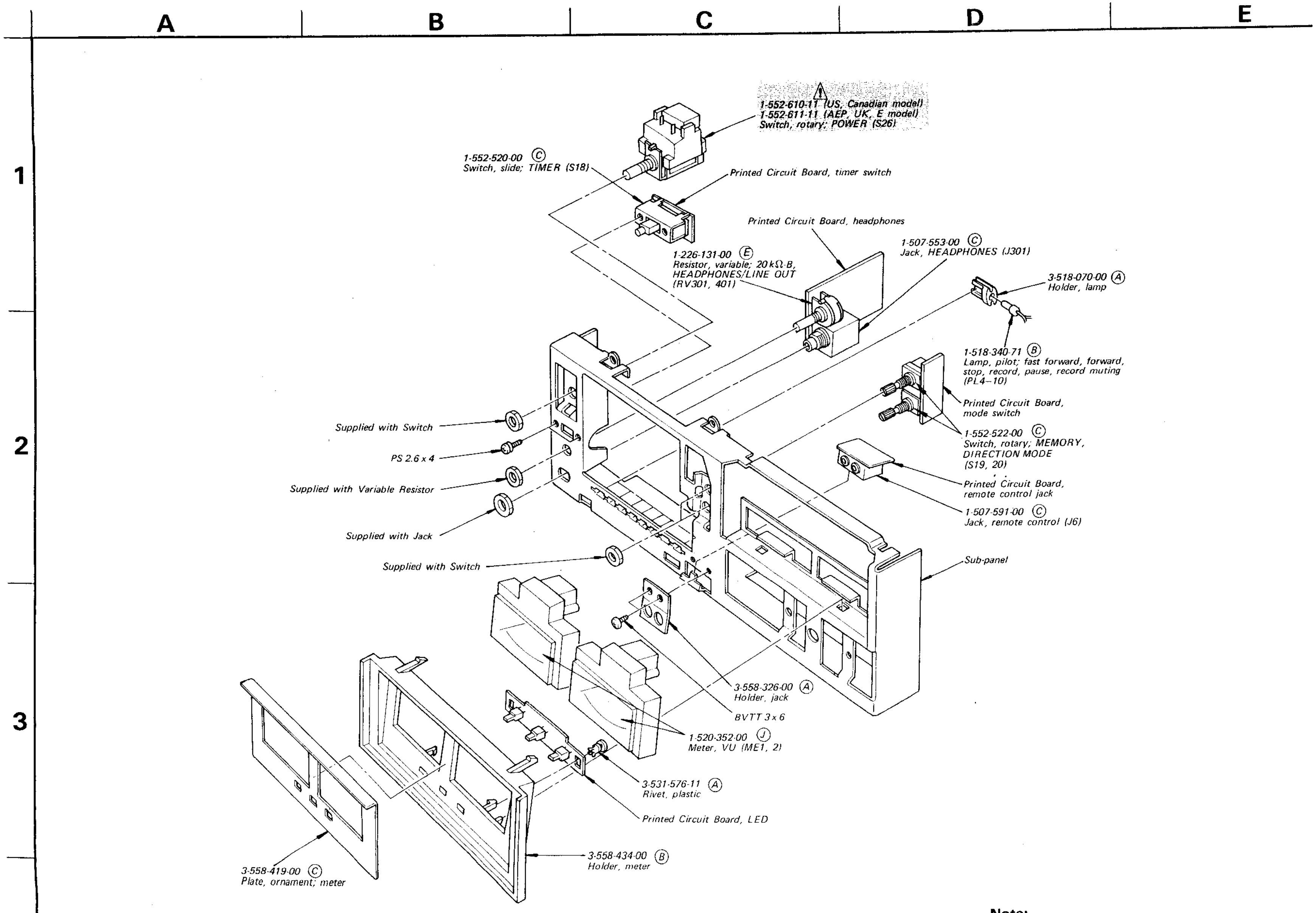
Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un trame et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

5-3.


A
B
C
D
E
1
2
3
⚠ 1-552-610-11 (US, Canadian model)
1-552-611-11 (AEP, UK, E model)
Switch, rotary; POWER (S26)
1-552-520-00 Ⓒ
Switch, slide; TIMER (S18)
Printed Circuit Board, timer switch
Printed Circuit Board, headphones
1-507-553-00 Ⓒ
Jack, HEADPHONES (J301)
1-226-131-00 Ⓔ
Resistor, variable; 20 kΩ B, HEADPHONES/LINE OUT (RV301, 401)
3-518-070-00 Ⓐ
Holder, lamp
1-518-340-71 Ⓑ
Lamp, pilot; fast forward, forward, stop, record, pause, record muting (PL4–10)
Printed Circuit Board, mode switch
1-552-522-00 Ⓒ
Switch, rotary; MEMORY, DIRECTION MODE (S19, 20)
Printed Circuit Board, remote control jack
1-507-591-00 Ⓒ
Jack, remote control (J6)
Sub-panel
Supplied with Switch
PS 2.6 x 4
Supplied with Variable Resistor
Supplied with Jack
Supplied with Switch
3-558-326-00 Ⓐ
Holder, jack
BVTT 3 x 6
1-520-352-00 Ⓙ
Meter, VU (ME1, 2)
3-531-576-11 Ⓐ
Rivet, plastic
Printed Circuit Board, LED
3-558-434-00 Ⓑ
Holder, meter
3-558-419-00 Ⓒ
Plate, ornament; meter

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

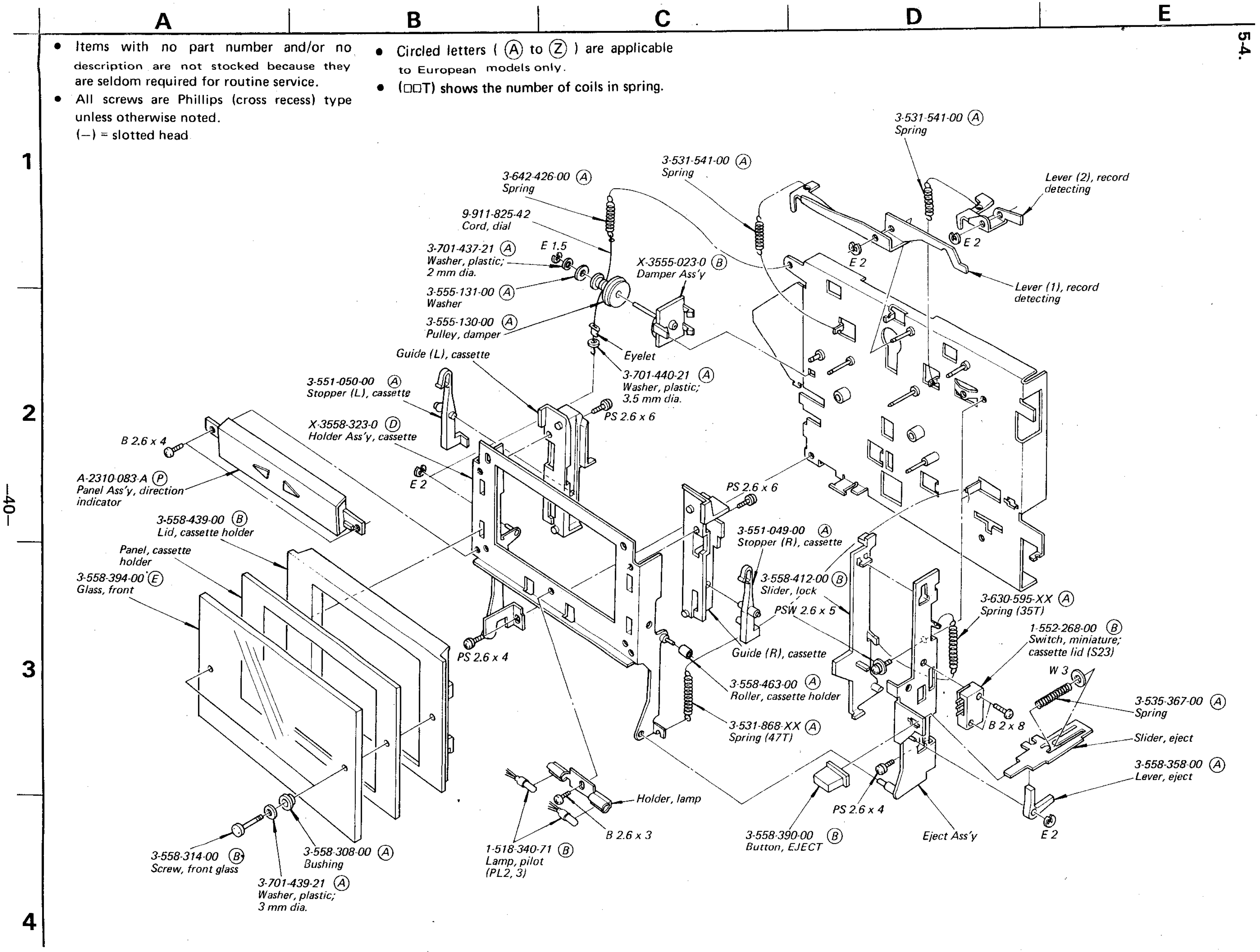
Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European

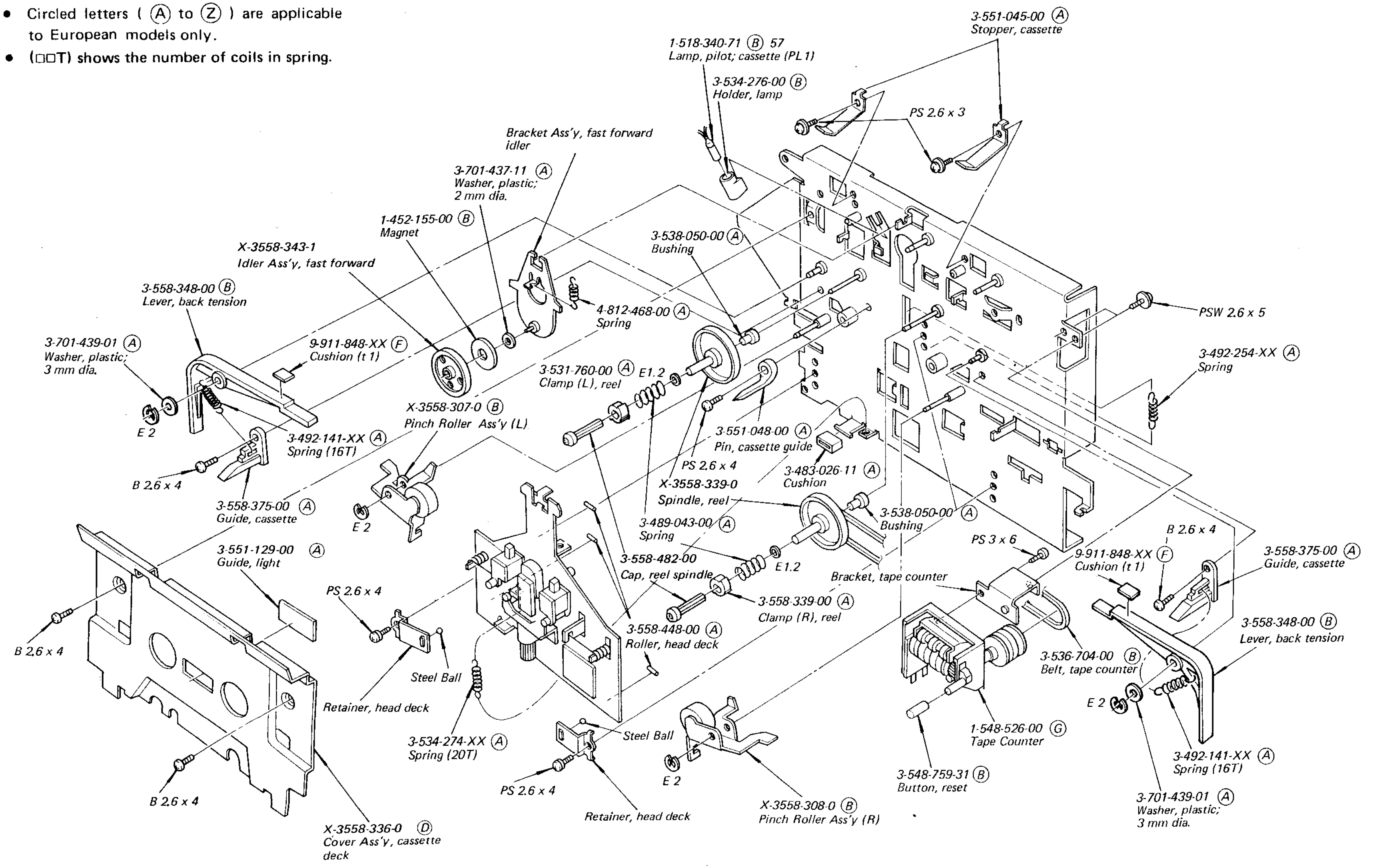
5-4.

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
(–) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.
- (□□T) shows the number of coils in spring.

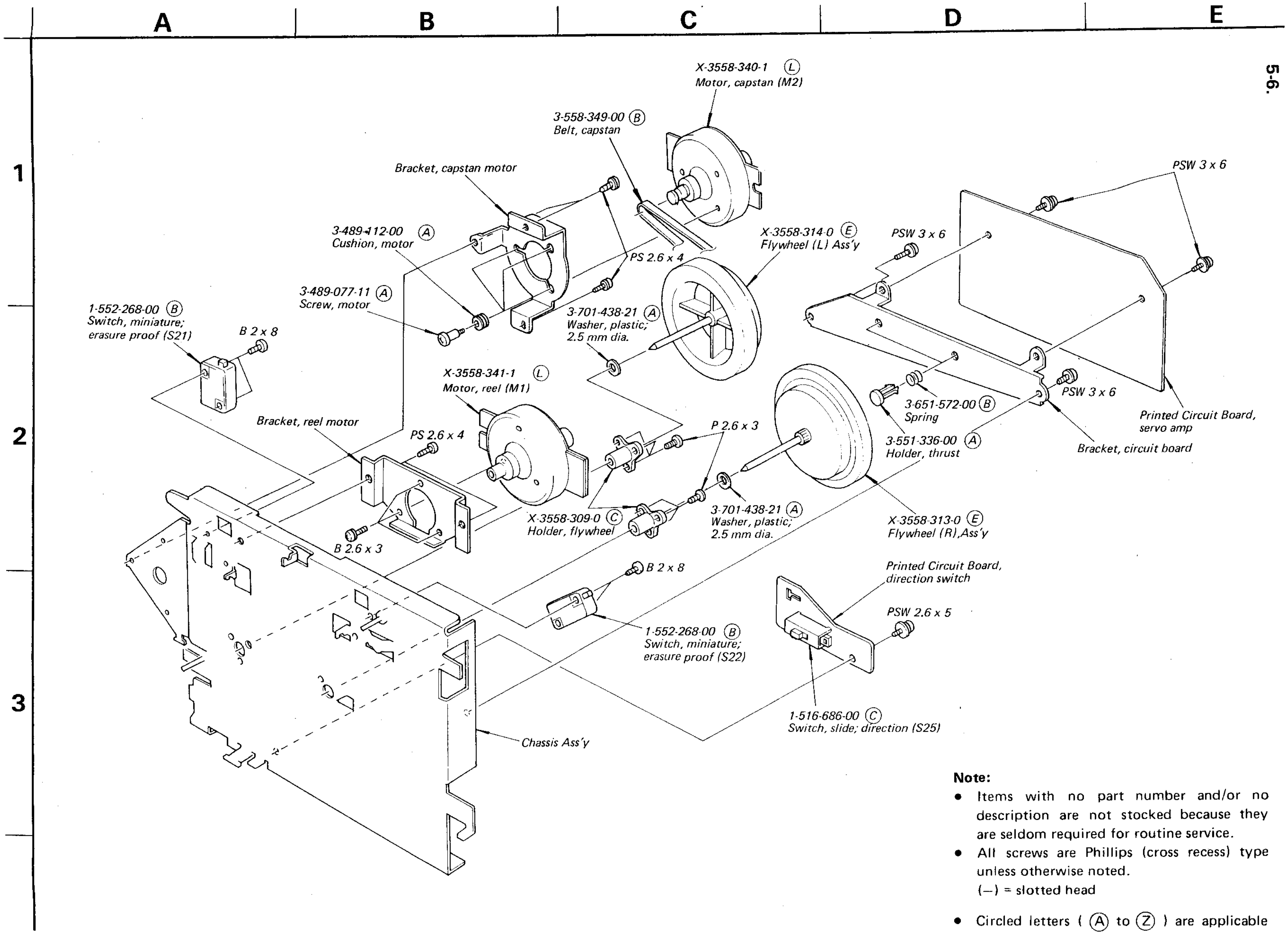

A
B
C
D
E
1
2
3
4
3-531-541-00 Ⓐ
Spring
3-531-541-00 Ⓐ
Spring
Lever (2), record detecting
E 2
E 2
Lever (1), record detecting
3-642-426-00 Ⓐ
Spring
9-911-825-42
Cord, dial
3-701-437-21 Ⓐ
Washer, plastic; 2 mm dia.
E 1.5
X-3555-023-0 Ⓑ
Damper Ass'y
3-555-131-00 Ⓐ
Washer
3-555-130-00 Ⓐ
Pulley, damper
Eyelet
Guide (L), cassette
3-701-440-21 Ⓐ
Washer, plastic; 3.5 mm dia.
3-551-050-00 Ⓐ
Stopper (L), cassette
PS 2.6 x 6
X-3558-323-0 Ⓓ
Holder Ass'y, cassette
B 2.6 x 4
A-2310-083-A Ⓟ
Panel Ass'y, direction indicator
E 2
PS 2.6 x 6
3-558-439-00 Ⓑ
Lid, cassette holder
3-551-049-00 Ⓐ
Stopper (R), cassette
Panel, cassette holder
3-558-394-00 Ⓔ
Glass, front
3-558-412-00 Ⓑ
Slider, lock
PSW 2.6 x 5
3-630-595-XX Ⓐ
Spring (35T)
1-552-268-00 Ⓑ
Switch, miniature; cassette lid (S23)
PS 2.6 x 4
Guide (R), cassette
W 3
3-558-463-00 Ⓐ
Roller, cassette holder
3-535-367-00 Ⓐ
Spring
B 2 x 8
3-531-868-XX Ⓐ
Spring (47T)
Slider, eject
3-558-358-00 Ⓐ
Lever, eject
Holder, lamp
PS 2.6 x 4
B 2.6 x 3
3-558-390-00 Ⓑ
Button, EJECT
Eject Ass'y
E 2
3-558-314-00 Ⓑ
Screw, front glass
3-558-308-00 Ⓐ
Bushing
1-518-340-71 Ⓑ
Lamp, pilot (PL2, 3)
3-701-439-21 Ⓐ
Washer, plastic; 3 mm dia.

5-5.

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.
- (□□T) shows the number of coils in spring.


A
B
C
D
E
1
2
3
4
3-551-045-00 Ⓐ Stopper, cassette
1-518-340-71 Ⓑ 57 Lamp, pilot; cassette (PL1)
3-534-276-00 Ⓑ Holder, lamp
PS 2.6 x 3
Bracket Ass'y, fast forward idler
3-701-437-11 Ⓐ Washer, plastic; 2 mm dia.
1-452-155-00 Ⓑ Magnet
X-3558-343-1 Idler Ass'y, fast forward
3-538-050-00 Ⓐ Bushing
3-558-348-00 Ⓑ Lever, back tension
4-812-468-00 Ⓐ Spring
PSW 2.6 x 5
3-701-439-01 Ⓐ Washer, plastic; 3 mm dia.
9-911-848-XX Ⓕ Cushion (t 1)
3-531-760-00 Ⓐ Clamp (L), reel
E 1.2
3-492-254-XX Ⓐ Spring
E 2
X-3558-307-0 Ⓑ Pinch Roller Ass'y (L)
3-492-141-XX Ⓐ Spring (16T)
3-551-048-00 Ⓐ Pin, cassette guide
B 2.6 x 4
PS 2.6 x 4
3-483-026-11 Ⓐ Cushion
X-3558-339-0 Spindle, reel
3-558-375-00 Ⓐ Guide, cassette
E 2
3-489-043-00 Ⓐ Spring
3-538-050-00 Ⓐ Bushing
3-551-129-00 Ⓐ Guide, light
PS 3 x 6
B 2.6 x 4
3-558-482-00 Cap, reel spindle
E 1.2
9-911-848-XX Ⓕ Cushion (t 1)
3-558-375-00 Ⓐ Guide, cassette
Bracket, tape counter
PS 2.6 x 4
3-558-339-00 Ⓐ Clamp (R), reel
B 2.6 x 4
3-558-448-00 Ⓐ Roller, head deck
3-558-348-00 Ⓑ Lever, back tension
3-536-704-00 Ⓑ Belt, tape counter
Steel Ball
E 2
Retainer, head deck
1-548-526-00 Ⓖ Tape Counter
3-534-274-XX Ⓐ Spring (20T)
Steel Ball
3-492-141-XX Ⓐ Spring (16T)
B 2.6 x 4
E 2
3-548-759-31 Ⓑ Button, reset
PS 2.6 x 4
3-701-439-01 Ⓐ Washer, plastic; 3 mm dia.
X-3558-336-0 Ⓓ Cover Ass'y, cassette deck
Retainer, head deck
X-3558-308-0 Ⓑ Pinch Roller Ass'y (R)

5-6.


A
B
C
D
E
1
2
3
X-3558-340-1 Ⓛ
Motor, capstan (M2)
3-558-349-00 Ⓑ
Belt, capstan
Bracket, capstan motor
3-489-412-00 Ⓐ
Cushion, motor
3-489-077-11 Ⓐ
Screw, motor
PS 2.6 x 4
X-3558-314-0 Ⓔ
Flywheel (L) Ass'y
3-701-438-21 Ⓐ
Washer, plastic;
2.5 mm dia.
PSW 3 x 6
PSW 3 x 6
1-552-268-00 Ⓑ
Switch, miniature;
erasure proof (S21)
B 2 x 8
X-3558-341-1 Ⓛ
Motor, reel (M1)
Bracket, reel motor
PS 2.6 x 4
P 2.6 x 3
3-651-572-00 Ⓑ
Spring
PSW 3 x 6
Printed Circuit Board,
servo amp
3-551-336-00 Ⓐ
Holder, thrust
Bracket, circuit board
X-3558-309-0 Ⓒ
Holder, flywheel
B 2.6 x 3
3-701-438-21 Ⓐ
Washer, plastic;
2.5 mm dia.
X-3558-313-0 Ⓔ
Flywheel (R),Ass'y
B 2 x 8
Printed Circuit Board,
direction switch
PSW 2.6 x 5
1-552-268-00 Ⓑ
Switch, miniature;
erasure proof (S22)
1-516-686-00 Ⓒ
Switch, slide; direction (S25)
Chassis Ass'y

Note:

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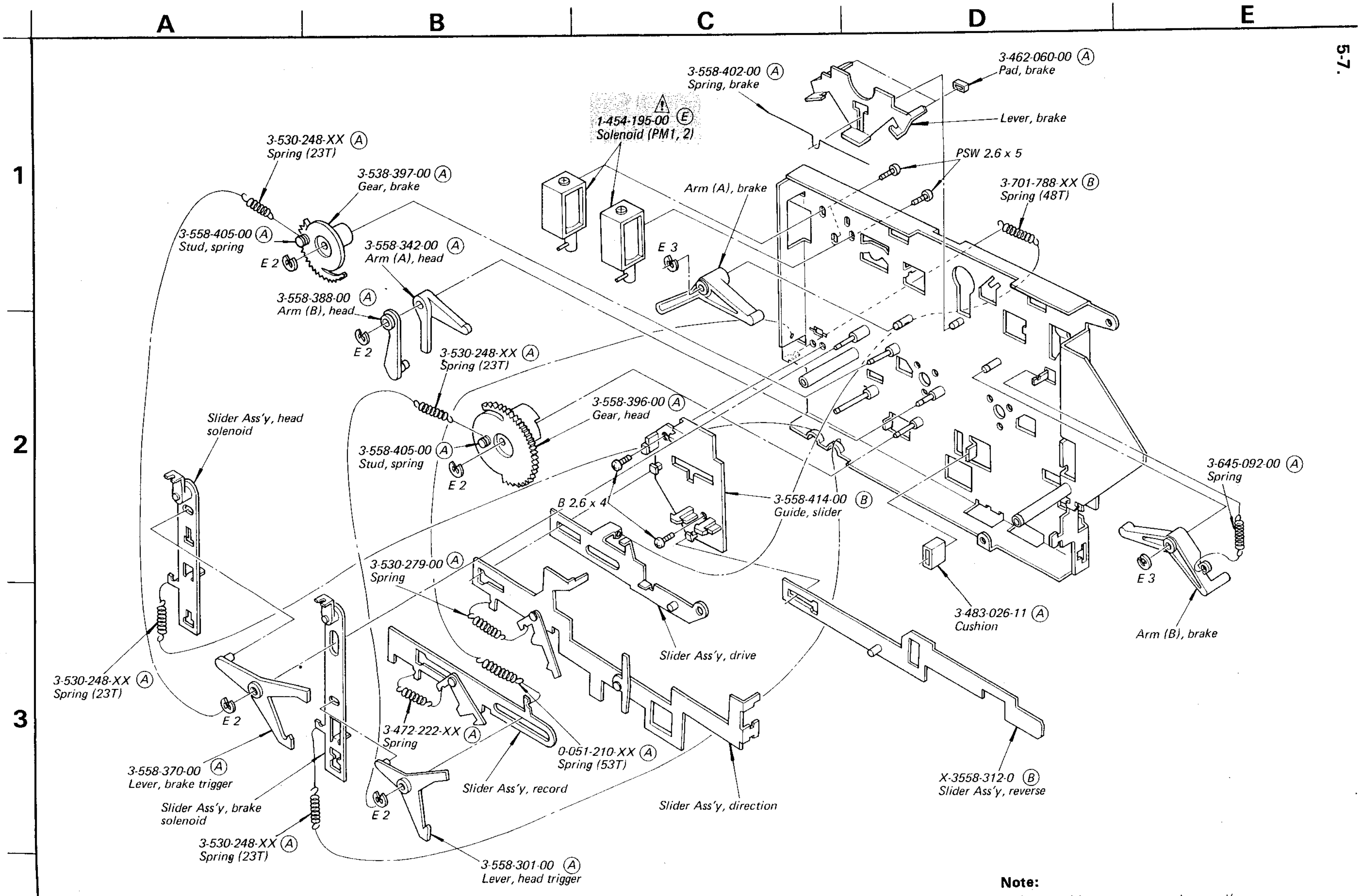
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

5-7.


A
B
C
D
E
1
2
3
3-558-402-00 (A)
Spring, brake
3-462-060-00 (A)
Pad, brake
Lever, brake
⚠ 1-454-195-00 (E)
Solenoid (PM1, 2)
PSW 2.6 x 5
3-701-788-XX (B)
Spring (48T)
3-530-248-XX (A)
Spring (23T)
3-538-397-00 (A)
Gear, brake
Arm (A), brake
3-558-405-00 (A)
Stud, spring
E 2
E 3
3-558-342-00 (A)
Arm (A), head
3-558-388-00 (A)
Arm (B), head
E 2
3-530-248-XX (A)
Spring (23T)
3-558-396-00 (A)
Gear, head
Slider Ass'y, head
solenoid
3-558-405-00 (A)
Stud, spring
E 2
3-645-092-00 (A)
Spring
B 2.6 x 4
3-558-414-00 (B)
Guide, slider
E 3
3-530-279-00 (A)
Spring
3-483-026-11 (A)
Cushion
Arm (B), brake
Slider Ass'y, drive
3-530-248-XX (A)
Spring (23T)
E 2
3-472-222-XX (A)
Spring
0-051-210-XX (A)
Spring (53T)
3-558-370-00 (A)
Lever, brake trigger
Slider Ass'y, record
X-3558-312-0 (B)
Slider Ass'y, reverse
Slider Ass'y, brake
solenoid
E 2
Slider Ass'y, direction
3-530-248-XX (A)
Spring (23T)
3-558-301-00 (A)
Lever, head trigger

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note:

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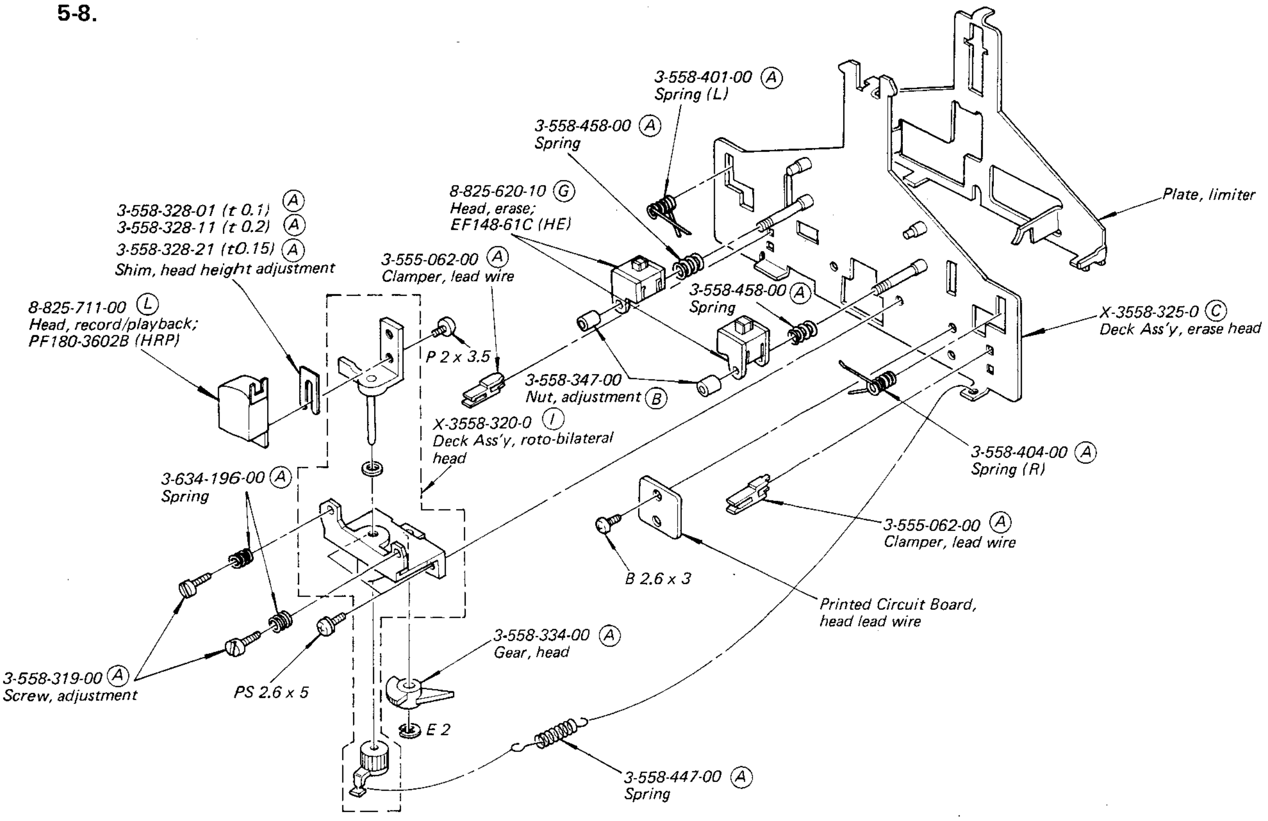
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.
- (□□T) shows the number of coils in spring.

A B C D

5-8.


3-558-401-00 (A)
Spring (L)
3-558-458-00 (A)
Spring
8-825-620-10 (G)
Head, erase;
EF148-61C (HE)
3-558-328-01 (t 0.1) (A)
3-558-328-11 (t 0.2) (A)
3-558-328-21 (t0.15) (A)
Shim, head height adjustment
3-555-062-00 (A)
Clamper, lead wire
Plate, limiter
8-825-711-00 (L)
Head, record/playback;
PF180-3602B (HRP)
3-558-458-00 (A)
Spring
X-3558-325-0 (C)
Deck Ass'y, erase head
P 2 x 3.5
3-558-347-00
Nut, adjustment (B)
X-3558-320-0 (I)
Deck Ass'y, roto-bilateral head
3-558-404-00 (A)
Spring (R)
3-634-196-00 (A)
Spring
3-555-062-00 (A)
Clamper, lead wire
B 2.6 x 3
Printed Circuit Board,
head lead wire
3-558-334-00 (A)
Gear, head
3-558-319-00 (A)
Screw, adjustment
PS 2.6 x 5
E 2
3-558-447-00 (A)
Spring

2

3

Note:

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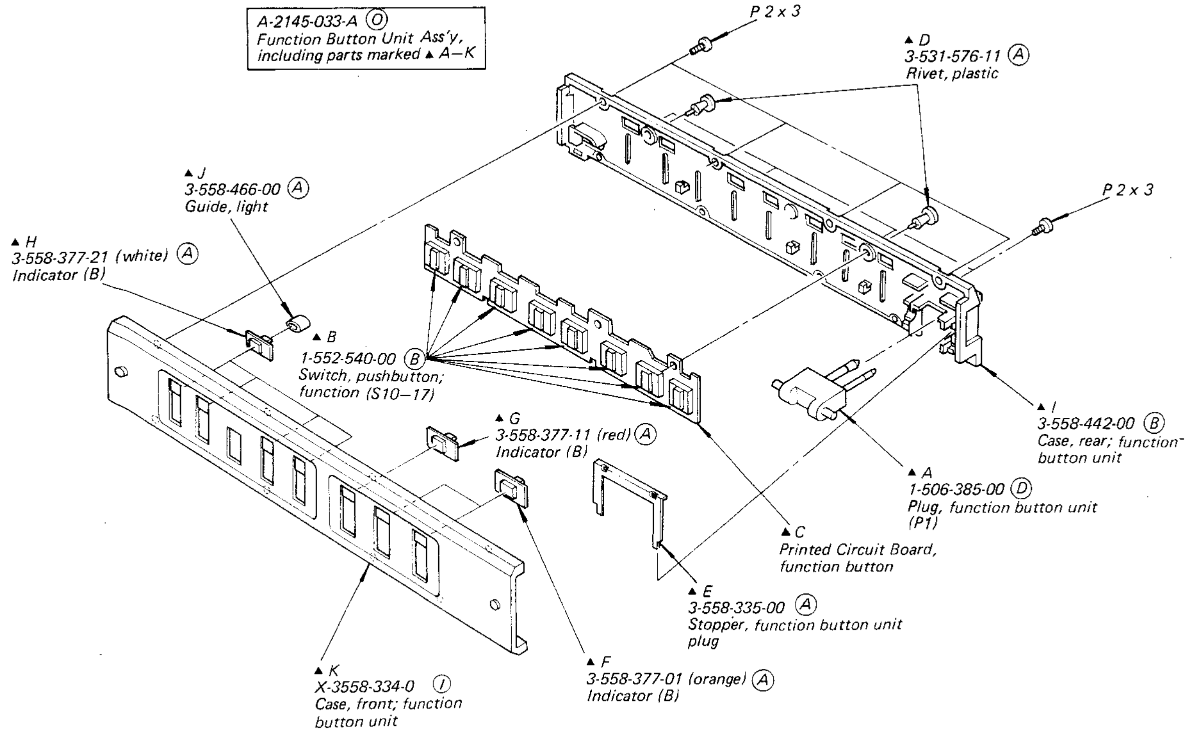
- All screws are Phillips (cross recess) type unless otherwise noted.
  (−) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

4

5-9.


A B C D
1 2 3
A-2145-033-A Ⓞ
Function Button Unit Ass'y, including parts marked ▲ A–K
P 2 x 3
▲ D
3-531-576-11 Ⓐ
Rivet, plastic
P 2 x 3
▲ J
3-558-466-00 Ⓐ
Guide, light
▲ H
3-558-377-21 (white) Ⓐ
Indicator (B)
▲ B
1-552-540-00 Ⓑ
Switch, pushbutton; function (S10–17)
▲ I
3-558-442-00 Ⓑ
Case, rear; function button unit
▲ G
3-558-377-11 (red) Ⓐ
Indicator (B)
▲ A
1-506-385-00 Ⓓ
Plug, function button unit (P1)
▲ C
Printed Circuit Board, function button
▲ E
3-558-335-00 Ⓐ
Stopper, function button unit plug
▲ K
X-3558-334-0 Ⓘ
Case, front; function button unit
▲ F
3-558-377-01 (orange) Ⓐ
Indicator (B)

Note:

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  (–) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

SECTION 6
ELECTRICAL PART LIST

- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

PRINTED CIRCUIT BOARD .

Ref. No.	*Part No.*	*Description*
	1-588-144-00	Ⓑ Voltage Selector (AEP, UK, E model)

SEMICONDUCTORS

Transistors

Ref. No.	*Part No.*	*Description*
Q101–105 Q201–205	8-729-334-58	Ⓑ 2SC1345
⇒ Q106, 206	8-729-663-47	Ⓑ 2SC1364
Q107, 207	8-729-334-58	Ⓑ 2SC1345
⇒ Q108, 208 Q109, 209	8-729-663-47	Ⓑ 2SC1364
⇒ Q110, 210	8-760-335-10	Ⓑ 2SC1474
⇒ Q111, 211	8-729-663-47	Ⓑ 2SC1364
Q112, 212	8-729-334-58	Ⓑ 2SC1345
⇒ Q113, 213	8-727-788-00	Ⓑ 2SA678
⇒ Q114–117 Q214–217	8-729-663-47	Ⓑ 2SC1364
⇒ Q301–304 Q401–404	8-729-663-47	Ⓑ 2SC1364
⇒ Q501–507	8-729-663-47	Ⓑ 2SC1364
⇒ Q508	8-760-413-10	Ⓒ 2SC1475
⇒ Q509	8-729-663-47	Ⓑ 2SC1364
Q510	8-729-217-33	Ⓒ 2SC1173
⇒ Q511, 512	8-729-663-47	Ⓑ 2SC1364
Q513	8-729-203-04	Ⓑ 2SK30A
⇒ Q514, 515	8-729-663-47	Ⓑ 2SC1364
Q601	8-729-217-33	Ⓒ 2SC1173
⇒ Q602	8-729-316-12	Ⓓ 2SC1061
⇒ Q603	8-729-663-47	Ⓑ 2SC1364
Q604	8-727-788-00	Ⓑ 2SA678
Q605, 606	8-729-160-51	Ⓑ 2SB605
⇒ Q607–619	8-729-663-47	Ⓑ 2SC1364
Q620	8-729-157-11	Ⓑ 2SD571
⇒ Q621	8-729-663-47	Ⓑ 2SC1364
Q622	8-729-157-11	Ⓑ 2SD571
⇒ Q624–627	8-729-663-47	Ⓑ 2SC1364
Q628	8-729-157-11	Ⓑ 2SD571
⇒ Q629, 631	8-729-663-47	Ⓑ 2SC1364
⇒ Q801	8-729-663-47	Ⓑ 2SC1364
Q802	8-729-141-43	Ⓑ 2SD414
Q803, 804	8-729-154-83	Ⓑ 2SB548
Q805	8-729-141-43	Ⓑ 2SD414
⇒ Q806–813	8-729-663-47	Ⓑ 2SC1364
⇒ Q814	8-727-788-00	Ⓑ 2SA678
Q815	8-729-141-43	Ⓑ 2SD414
Q816, 817	8-729-154-83	Ⓑ 2SB548
Q818	8-729-141-43	Ⓑ 2SD414
⇒ Q819	8-727-788-00	Ⓑ 2SA678
⇒ Q820, 821	8-729-663-47	Ⓑ 2SC1364

- ⇒ : Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

ICs

Ref. No.	*Part No.*	*Description*
⇒ IC301	8-759-145-57	Ⓒ μPC4557C
IC601	8-759-147-22	Ⓛ μPD547-022
IC602	8-759-240-19	Ⓒ TC4019P
⇒ IC603–606	8-759-145-57	Ⓒ μPC4557C
IC607	8-759-940-69	Ⓓ MSM4069
IC801	8-759-600-65	Ⓕ CX065A
⇒ IC802–804	8-759-145-58	Ⓓ μPC4558C

Diodes

Ref. No.	*Part No.*	*Description*
D301, 401 D302, 402	8-719-815-55	Ⓑ 1S1555
⇒ D303, 403	8-719-422-21	Ⓑ 1T22AM
D304, 404	8-719-815-55	Ⓑ 1S1555
D501–503	8-719-901-37	Ⓑ SLP137B
D504	8-719-815-55	Ⓑ 1S1555
⇒ D505	8-719-930-12	Ⓑ EQB01-12Z
D601–604	⚠ 8-719-200-02	Ⓑ 10E2
D605, 606	⚠ 8-719-511-10	Ⓒ S1VB10
D607	⚠ 8-719-200-02	Ⓑ 10E2
⇒ D608	8-719-931-15	Ⓑ EQB01-15
D609	8-719-200-02	Ⓑ 10E2
⇒ D611	8-719-930-11	Ⓑ EQB01-11Z
D612–618	8-719-815-55	Ⓑ 1S1555
D619,620	⚠ 8-719-200-02	Ⓑ 10E2
D622, 623	8-719-815-55	Ⓑ 1S1555
D626	8-719-815-55	Ⓑ 1S1555
⇒ D627	8-819-815-55	Ⓑ 1S1555
D801–809	8-719-815-55	Ⓑ 1S1555

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

COILS

Ref. No.	*Part No.*	*Description*
L101, 201	1-407-203-XX	Ⓐ 5.6 mH, microinductor
L102, 202	1-407-199-XX	Ⓑ 2.7 mH, microinductor
L103, 203	1-407-198-XX	Ⓐ 2.2 mH, microinductor
L501, 502	1-407-211-XX	Ⓑ 27 μH, microinductor
L601	1-405-800-00	Ⓑ Osc

TRANSFORMERS

Ref. No.		*Part No.*	*Description*
T1	⚠	1-446-216-00	Power (US, Canadian model)
	⚠	1-446-217-00	Ⓝ Power (AEP, UK, E model)
T501		1-433-132-11	Ⓑ Bias Osc

CAPACITORS

All capacitors are in μF and ceramic unless otherwise noted. 50WV or less are not indicated except for electrolytics. pF = μμF, elect = electrolytic

Ref. No.	*Part No.*	*Description*		
C101, 201	1-121-651-11	Ⓐ 10	16V	elect
C102, 202	1-161-323-11	Ⓐ 0.001		
C103, 203 C104, 204	1-121-915-11	Ⓑ 4.7	25V	elect
C105, 205	1-121-416-11	Ⓑ 100	25V	elect
C106, 206	1-121-409-11	Ⓐ 47	16V	elect
C107, 207	1-108-230-12	Ⓐ 0.0022		mylar
C108, 208	1-121-410-11	Ⓑ 47	25V	elect
C109, 209	1-121-915-11	Ⓑ 4.7	25V	elect
C110, 210	1-161-318-11	Ⓐ 390p		
C111, 211	1-161-271-11	Ⓐ 100p		
C112, 212	1-107-037-11	Ⓐ 82p	500V	silvered mica
C113, 213	1-161-317-11	Ⓐ 330p		
C114, 214	1-161-269-11	Ⓐ 68p		
C115, 215	1-121-402-11	Ⓐ 33	10V	elect
C116, 216	1-161-271-11	Ⓐ 100p		
C117, 217	1-130-190-11	Ⓑ 0.039	100V	polyethylene
C118, 218	1-121-450-11	Ⓐ 2.2	50V	elect
C119, 219	1-108-234-12	Ⓐ 0.0047		mylar
C120, 220	1-161-319-11	Ⓐ 470p		
C121, 221	1-121-391-11	Ⓐ 1	50V	elect

- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	*Part No.*	*Description*		
C122, 222	1-121-404-11	Ⓐ 33	25V	elect
C123, 223	1-161-317-11	Ⓐ 330p		
C124, 224	1-121-414-11	Ⓐ 100	10V	elect
C125, 225	1-161-265-11	Ⓐ 33p		
C126, 226	1-161-263-11	Ⓐ 22p		
C127, 227	1-121-352-11	Ⓐ 47	10V	elect
C128, 228	1-121-480-11	Ⓐ 22	25V	elect
C129, 229	1-121-398-11	Ⓐ 10	25V	elect
C130, 230	1-121-416-11	Ⓑ 100	25V	elect
C131	1-121-391-11	Ⓐ 1	50V	elect
C132, 232	1-121-651-11	Ⓐ 10	16V	elect
C133, 233	1-121-398-11	Ⓐ 10	25V	elect
C134, 234	1-121-404-11	Ⓐ 33	25V	elect
C135, 235	1-108-251-12	Ⓑ 0.1		mylar
C136, 236	1-121-392-11	Ⓐ 3.3	25V	elect
C137, 237	1-121-450-11	Ⓐ 2.2	50V	elect
C138, 238	1-121-651-11	Ⓐ 10	16V	elect
C139, 239	1-108-242-12	Ⓐ 0.022		mylar
C140, 240	1-108-589-12	Ⓐ 0.027		mylar
C141, 241	1-108-362-12	Ⓑ 0.082		mylar
C142, 242	1-108-591-12	Ⓐ 0.033		mylar
C143, 243	1-108-361-12	Ⓐ 0.056		mylar
C144, 244 C145, 245	1-121-391-11	Ⓐ 1	50V	elect
C146, 246	1-121-651-00	Ⓐ 10	16V	elect
C301, 401	1-108-581-12	Ⓐ 0.012		mylar
C302, 402	1-108-239-12	Ⓐ 0.01		mylar
C303, 403	1-108-361-12	Ⓐ 0.056		mylar
C304, 404	1-108-355-12	Ⓐ 0.0056		mylar
C305, 405	1-161-257-11	Ⓐ 6.8p		
C306, 406	1-121-651-11	Ⓐ 10	16V	elect
C307, 407	1-108-567-12	Ⓐ 0.0033		mylar
C308, 408	1-121-450-11	Ⓐ 2.2	50V	elect
C309, 409	1-108-234-12	Ⓐ 0.0047		mylar
C310, 410	1-121-392-11	Ⓐ 3.3	25V	elect

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref.No.	Part No.	Description			
C311, 411	1-161-021-11	Ⓐ	0.047	(semiconductor)	
C312, 412	1-121-404-11	Ⓐ	33	25V	elect
C313	1-121-416-11	Ⓑ	100	25V	elect
C501	1-121-395-11	Ⓐ	4.7	25V	elect
C502	1-129-701-11	Ⓐ	0.01	100V	polyethylene
C503	1-130-189-11	Ⓑ	0.018	100V	polyethylene
C504	1-131-350-11	Ⓑ	3.3	35V	tantalum
C505,506	1-141-010-XX	Ⓑ	Trimmer, 120p		
C507,508	1-107-037-11	Ⓐ	82p	500V	mica
C509	1-129-710-11	Ⓑ	0.0047	630V	polyethylene
C510,511	1-107-091-11	Ⓐ	180p		mica
C512	1-121-415-11	Ⓐ	100	16V	elect
C513	1-121-357-11	Ⓑ	100	35V	elect
C514	1-121-416-11	Ⓑ	100	25V	elect
C515	1-121-417-11	Ⓑ	100	50V	elect
C516	1-121-726-11	Ⓐ	0.47	50V	elect
C517	1-121-450-11	Ⓐ	2.2	50V	elect
C601	⚠1-123-364-11	Ⓒ	1000	50V	elect
C602	⚠1-123-361-11	Ⓑ	220	50V	elect
C603,604	⚠1-123-325-11	Ⓑ	2200	16V	elect
C605,606	⚠1-123-334-11	Ⓑ	220	25V	elect
C607–610	1-121-651-11	Ⓐ	10	16V	elect
C611,612	1-121-395-11	Ⓐ	4.7	25V	elect
C613–618	1-121-726-11	Ⓐ	0.47	50V	elect
C619	1-121-651-11	Ⓐ	10	16V	elect
C620	1-161-323-11	Ⓐ	0.001		
C621	1-161-379-11	Ⓐ	0.01		
C622–624	1-121-651-11	Ⓐ	10	16V	elect
C625	1-121-395-11	Ⓐ	4.7	25V	elect
C801	1-123-228-11	Ⓑ	1	50V	elect (nonpolarized)
C802,803	1-121-651-11	Ⓐ	10	16V	elect
C804	1-108-240-12	Ⓐ	0.015		mylar
C805	1-130-134-00	Ⓑ	0.082	100V	laminated
C806	1-121-395-11	Ⓐ	4.7	25V	elect
C807	1-121-450-11	Ⓐ	2.2	50V	elect
C808	1-121-395-11	Ⓐ	4.7	25V	elect
C809,810	1-123-228-11	Ⓑ	1	50V	elect (nonpolarized)
C811–813	1-161-323-11	Ⓐ	0.001		
C814,815	1-123-232-11	Ⓑ	4.7	50V	elect (nonpolarized)
C816,817	1-108-364-12	Ⓐ	0.18		mylar
C818	1-123-232-11	Ⓑ	4.7	50V	elect (nonpolarized)
C819	1-121-738-11	Ⓐ	10	50V	elect
C822	1-121-651-11	Ⓐ	10	16V	elect
C850,851	1-121-415-11	Ⓐ	100	16V	elect

RESISTORS

All resistors are in ohms. Common ¼W carbon resistors are omitted. Check schematic diagram for values.

Ref. No.	Part No.	Description			
R111,211	⚠1-244-869-11	Ⓐ	680	½W	carbon
R129,229	1-244-885-11	Ⓐ	3.3k	½W	carbon
R144,244	1-244-917-11	Ⓐ	68k	½W	carbon
R146,246	1-244-906-11	Ⓐ	24k	½W	carbon
R158,258	1-244-891-11	Ⓐ	5.6k	½W	carbon
R160,260	⚠1-244-869-11	Ⓐ	680	½W	carbon
R167,267	⚠1-244-873-11	Ⓐ	1k	½W	carbon
R328	⚠1-244-861-11	Ⓐ	330	½W	carbon
R522	⚠1-246-409-11	Ⓐ	2.2	¼W	carbon
R602	⚠1-244-889-11	Ⓐ	4.7k	½W	carbon
R606	⚠1-206-477-11	Ⓐ	39	2W	metal oxide (nonflammable)
R609	1-214-176-11	Ⓐ	68k	¼W	metal oxide (1%)
R613	⚠1-244-867-11	Ⓐ	560	½W	carbon
R629	1-214-180-11	Ⓐ	100k	¼W	metal oxide (1%)
R631	1-214-138-11	Ⓐ	1.8k	¼W	metal oxide (1%)
R632	1-214-142-11	Ⓐ	2.7k	¼W	metal oxide (1%)
R633	1-214-139-11	Ⓐ	2k	¼W	metal oxide (1%)
R634	1-214-136-11	Ⓐ	1.5k	¼W	metal oxide (1%)
R635,636	1-214-132-11	Ⓐ	1k	¼W	metal oxide (1%)
R638	1-214-167-11	Ⓐ	30k	¼W	metal oxide (1%)
R639	1-214-144-11	Ⓐ	3.3k	¼W	metal oxide (1%)
R640	1-214-154-11	Ⓐ	8.2k	¼W	metal oxide (1%)
R728,729	⚠1-206-463-11	Ⓐ	10	2W	metal oxide (nonflammable)

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No	*Part No.*	*Description*
R731	⚠1-206-471-11	Ⓐ 22 2W metal oxide (nonflammable)
R751	1-210-113-11	Ⓐ 18k 1/8W carbon
R752	1-246-859-11	Ⓐ 20k 1/8W carbon
R753	1-246-863-11	Ⓐ 43k 1/8W carbon
R754	1-246-869-11	Ⓐ 130k 1/8W carbon
R755	1-210-114-11	Ⓐ 22k 1/8W carbon
R756	1-210-381-11	Ⓑ 33k 1/8W carbon
R804	1-214-176-11	Ⓐ 68k ¼W metal oxide
R805	1-214-180-00	Ⓐ 100k ¼W metal oxide
R838,839	⚠1-213-036-11	Ⓐ 1 1W fusible
R891,892	⚠1-212-393-11	Ⓐ 4.7 1W metal oxide (nonflammable)
RV101,201	1-226-294-00	Ⓔ 20k-A, variable; MIC
RV102,202	1-226-295-00	Ⓔ 50k-A, variable; LINE
RV103,203 RV104,204	1-224-646-XX	Ⓑ 22k-B, adjustable; playback level, record level
RV105,205	1-224-644-XX	Ⓑ 4.7k-B, adjustable; level meter
RV301,401	1-226-131-00	Ⓔ 20k-B, variable; HEADPHONES LINE OUT
RV501	1-224-647-XX	Ⓑ 47k-B, adjustable; bias
RV806	1-224-661-00	Ⓑ 47k-B, adjustable; speed
RV809,810	1-224-642-XX	Ⓑ 1k-B, adjustable; gain
RV816,819	1-224-645-XX	Ⓑ 10k-B, adjustable; offset
RV843	1-224-642-XX	Ⓑ 1k-B, adjustable; torque
RV854	1-224-633-00	Ⓑ 4.7k-B, adjustable; balance
RV860,861 RV874,875	1-224-645-XX	Ⓑ 10k-B, adjustable; offset

SWITCHES

Ref. No.	*Part No.*	*Description*
S1	1-552-521-00	Ⓒ slide, record/playback
S2	1-552-523-00	Ⓒ Lever-slide, BIAS
S3,4	1-552-524-00	Ⓒ Lever-slide, EQ, DOLBY NR
S10–17	1-552-540-00	Ⓑ pushbutton, function
S18	1-552-520-00	Ⓒ Slide, TIMER
S19,20	1-552-522-00	Ⓒ Rotary, MEMORY, DIRECTION MODE
S21–23	1-552-268-00	Ⓑ Miniature, eraser proof, cassette lid
S24	1-548-526-00	Ⓖ Tape Counter, w/switch
S25	1-516-686-00	Ⓒ Slide, direction
S26	⚠1-552-610-00	Rotary, POWER (US, Canadian model)
S26	⚠1-552-611-00	Ⓓ Rotary, POWER (AEP, UK, E model)

MISCELLANEOUS

Ref. No.	*Part No.*	*Description*
CNJ301	1-507-501-21 1-507-531-21	Ⓓ Jack, phono; 4p, LINE IN, LINE OUT-FIXED (AEP, UK, E mode Jack, phono; 4p, LINE IN, LINE OUT-FIXED (US, Canadian mo
CNJ302	1-507-526-21	Ⓑ Jack, phono; 2p, LINE OUT-VARIABLE
CP1	⚠ 1-231-326-00 1-231-341-00	Encapsulated Component (US model) Encapsulated Component (Canadian model)
CP601	⚠1-231-057-00	Ⓑ Encapsulated Component (AEP, UK, E model)
F1	⚠1-532-295-00	Ⓑ Fuse, 0.5A (AEP, UK, E model)
F2,3	⚠1-532-078-00	Ⓑ Fuse, 1A (AEP, UK, E model)
F101,201	1-231-388-00	Ⓒ Low-pass Filter
HE	8-825-620-10	Ⓖ Head, erase; EF148-61C
HRP	8-825-711-00	Ⓛ Head, record/playback; PF180-3602B
J6	1-507-591-00	Ⓒ Jack, remote control
J101,201	1-507-525-00	Ⓓ Jack, MIC
J301	1-507-553-00	Ⓒ Jack, HEADPHONES
M1	X-3558-341-1	Ⓜ Motor, reel
M2	X-3558-340-1	Ⓜ Motor, capstan
ME1, 2	1-520-352-00	Ⓙ Meter, level
P1	1-506-385-00	Ⓓ Plug, remote control
PL1–10	1-518-340-71	Ⓑ Lamp, pilot
PM1, 2	⚠1-454-195-00	Ⓔ Solenoid

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Part No.	*Description*
1-452-155-00	Ⓑ Magnet
⚠ 1-509-546-00	Ⓒ Connector, AC INPUT (AEP, UK, E model)
⚠ 1-526-528-00	Socket, AC OUTLET (US, Canadian model)
⚠ 1-533-131-00	Ⓐ Holder, fuse (AEP, UK, E model)
⚠ 1-534-986-XX	Cord, power (US, Canadian model)
⚠ 1-552-026-00	Ⓔ Voltage Selector (AEP, UK, E model)

ACCESSORIES AND PACKING MATERIALS

Part No.	*Description*
X-3701-105-0	Ⓐ Tips Ass'y, head cleaning
1-534-049-31	Ⓔ Cord, connection; RK-74H
⚠1-534-754-00	Cord, power; parallel-blade plug (E model)
⚠1-534-819-00	Ⓖ Cord, power (UK model)
⚠1-551-216-00	Cord, power; euro plug (E model)
1-551-576-00	Ⓘ Cord, remote control
3-429-126-00	Ⓑ Bag, plastic; set
3-558-465-00	Ⓑ Cushion (AEP, UK E model)
3-558-474-00	Ⓐ Spacer
3-558-475-00	Carton(US, Canadina model)
3-558-476-00	Ⓓ Carton(AEP, UK, E model)
3-558-478-00	Cushion (US, Canadian model)
3-701-630-00	Ⓐ Bag, plastic
3-770-549-11	Ⓖ Manual, instruction (AEP, UK, E model)
3-770-549-21	Manual, instruction (US model)
3-770-549-21	Manual, instruction (Canadian model)
3-794-316-31	
3-794-233-21	Ⓐ Leaflet

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

9-954-662-11
(With-81, –83)

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Consumer Products Group
Technical Support Dept.

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STEREO CASSETTE DECK

TC-K96R

AEP Model
E Model
Canadian Model
UK Model
US Model

No. 1
January, 1979

SUPPLEMENT

File this supplement with the service manual.

CIRCUIT DESCRIPTION

The system controller printed circuit board incorporates a micro computer.

The micro computer issued the drive signals for the solenoid, the reel motor, the capstan motor, etc., upon receiving the appropriate input signals from the operation switches, and thus carries out the switching required for each mode.

A simple explanation of the micro computer operation follows:

1. Micro Computer

The micro computer, literally, means a microscopic electronic computer. However, a computer, being more than a calculator, has functions similar to those of the human brain.

The human brain has three major functions.

1) Storage	a capacity to store (memorize) previously received information.
2) Decision	the ability to compare information obtained from the sense functions (eye, hand, leg, etc.) with the memorized information and to put out the most suitable instruction.
3) Instruction processing.	the ability to transmit the decisions to the body (hand, leg, etc.) and make it operate in the required way.

In the computer, the decision making, processing, and instruction generation part is called the CPU (Central Processing Unit): the storage part is the ROM (Read Only Memory = memory for only reading) or RAM (Random Access Memory = read/write portion): and the body corresponds to the I/O (I/O Interface = input/output devices).

To give a comprehensive name to all these electric circuits and functions, we use the term "computer".

There are however the following differences between the human brain and a computer.

(1) In the computer storage, matters once memorized will not be forgotten.
(2) The computer cannot make decisions regarding any non-stored information.
(3) In speed of processing or decision making, a computer is much faster.
(4) The computer cannot store as much as the human brain.

1) CPU

The CPU is the most important part of a computer and assumes a central role. Considering the CPU as a digital circuit, by applying a signal "we want to read contents of an address" at the input, the requested contents are output in response to the instruction. In other words the CPU carries out the processing taking out a sequential processing program from the program into which the instructions were entered and decoding the instructions.

In this device, a 4-bit CPU is employed. The 4-bit CPU is more suitable for system control rather than that for computations.

The CPU configuration in this device consists of a PC (Program Counter), STACK, DP (Data Point), ACC (Accumulator), ALU (Arithmetic Logic Unit). Each of these will be described below.

(a) PC (Program Counter)
This is a register which stores the address of the contents of the ROM to be processed next, so that the execution sequence of the program will be correctly followed.
Each time after executing one instruction, this is increased by + 1.

(b) STACK
This is a register for storing aside the contents of the PC when a subroutine is called or during interrupts.

(c) DP (Data Point)
This is a register which specifies the address of RAM.

(d) ACC (Accumulator)
This is a register for storage of the operation results of ALU or as a temporary storage external to the CPU.

(e) ALU (Arithmetic Logic Unit)
This is the arithmetic logic operation unit, which has functions of binary addition, increment, decrement, exclusive OR, comparison, etc.

2) Memory (Storage device)

(a) ROM (Read Only Memory)
This memory is only for reading. The following are the features of ROM. (1) It is difficult to modify the stored contents because it is impossible to rewrite the contents of ROM by a program. (2) Even if the power source is cut off, the contents stored in a ROM will not be erased. Utilizing these features, the ROM stores the data which should not change. Further, when no data is needed, the power dissipation can be made lower by switching off the power source.
In this device a 1000 word x 8-bit mask ROM is employed for storing the program, etc., and is addressed by the PC.
The features of a mask ROM.

(1) The chip size is smaller than that of a RAM.
(2) It is suitable for storing considerable data of the same pattern.
(3) It can be cheaper than a P-ROM in mass manufacture.

(b) RAM (Random Access Memory)
This is a memory in which data can be recorded or can be read out at any position in any sequence by specifying the address and the bit. In this microcomputer, data is stored in a 64 x 4-bit static RAM and is addressed by DP (Data Point).
The features of the static RAM.
(1) The power dissipation per bit is high.
(2) Operation speed is slow.
(3) Because data does not get erased with time, refreshing is not needed.

2. Programming

A program is a description of the sequence of operations to be followed by the computer expressed in a language that the computer can comprehend, and which is based on the basic functions possessed by the computer.

The language which the computer can understand is called the "machine language". The machine language descriptions are those that the computer can decode immediately and execute, and are expressed with the combination of "0" and "1". However, the machine language can be different for different computers.

Because the machine language is very much different from the English language, it is translated into an assembler language, and is expressed with mnemonics (these express instruction words, with letters which function as a mnemonic aid).

Some examples of descriptions in the machine language and in the assembler language employed in this micro-computer are given below.

Machine Language	Assembler Language	Contents of Operation
1010 0000	CLA	ACC ← 0 (Contents of the accumulator are cleared)

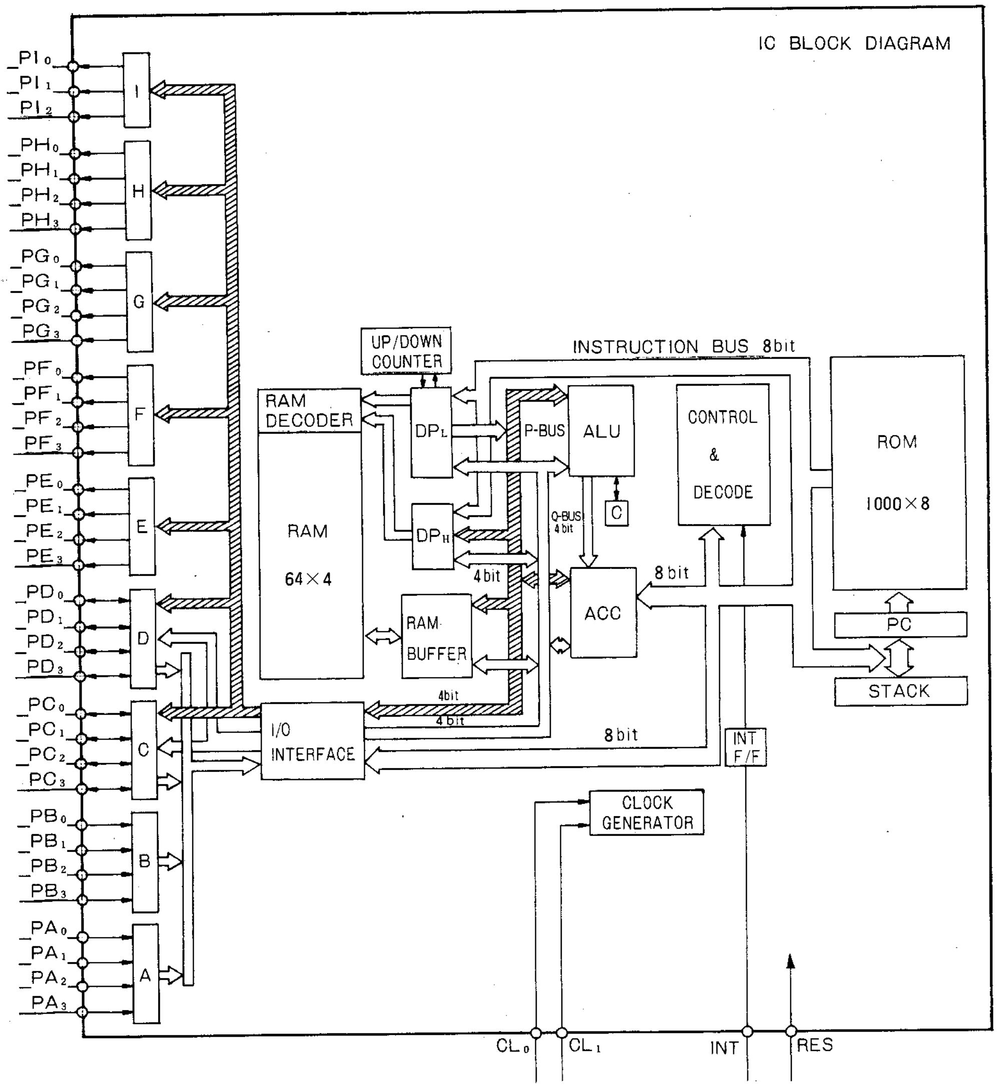

IC BLOCK DIAGRAM
PI₀
PI₁
PI₂
PH₀
PH₁
PH₂
PH₃
PG₀
PG₁
PG₂
PG₃
PF₀
PF₁
PF₂
PF₃
PE₀
PE₁
PE₂
PE₃
PD₀
PD₁
PD₂
PD₃
PC₀
PC₁
PC₂
PC₃
PB₀
PB₁
PB₂
PB₃
PA₀
PA₁
PA₂
PA₃
I
H
G
F
E
D
C
B
A
UP/DOWN COUNTER
RAM DECODER
RAM 64×4
DPL
DPH
RAM BUFFER
I/O INTERFACE
4bit
4bit
4bit
P-BUS
ALU
Q-BUS 4bit
C
ACC
8bit
8bit
CONTROL & DECODE
INSTRUCTION BUS 8bit
ROM 1000×8
PC
STACK
INT F/F
CLOCK GENERATOR
CL₀
CL₁
INT
RES

Fig. 1

3. Flow Chart

The flow chart expresses graphically the operating procedures and their functional implications.

The operations that we want the computer to do are written in accordance with the processing procedure.

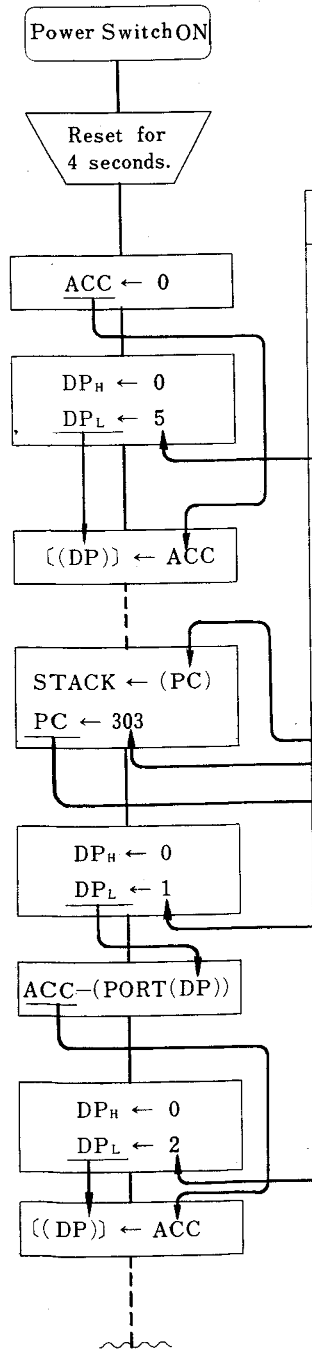
(When a program is written, the flow-chart is very frequently written since the pictorial representation facilitates defining and arranging the problem.)

A part of the operations in this micro-computer will be explained by means of the flow chart and the program.

SYMBOLS USED

ADDRESS	Contents of PC
OBJECT CODE . . .	Machine Language (binary notation)
DATA	Machine Language (hexadecimal notation)
INSTRUCTION . . .	Assembler Language (mnemonic)
( )	Contents of Register
[(XX)]	Contents of Memory Addressed by (X X)
◀──	Transfer Direction, Result

FLOW CHART



ADDRESS	OBJECT CODE	DATA	INSTRUCTION	COMMENT
000	10010000	90	CLA	Clear ACC.
001	10000101	85	LDZ	Clear DPH. Load the immediate data in DP.
002	00000010	02	S	Store the contents of ACC in RAM addressed by DP.
0 0B	10101011	AB	CAL	Transfer the contents of PC to STACK. Load the immediate data in PC. (Sub-routine call)
00C	00000011	03		
3 03	10000001	81	LDZ	
304	00110010	32	IP	Load the input port in ACC addressed by DP.
305	10000010	82	LDZ	
306	00000010	02	S	

Fig. 2

4. Specifications of IC μPD547-022

- P channel MOS, one chip microcomputer for control
- 42 pin plastic DIP
- 58 instructions
- ROM 1,000 x 8 bit
- RAM 64 x 4 bit
- Instruction circle: 10μ sec (clock = 400 kHz)

5. Calculation

1) Addition

0010······(2)
+0101······(5)
0111······(7)

2) Subtraction

1001······(9)
−0101······(5) ⇨
0100······(4)

1111
−0101······(5)
1010
+ 1
1011······(Complement)

⇩

1001······(9)
+1011······(Complement of 5)
1 0100······(4)
└→Disregard

3) Increment and carry

1111
+ 1······(Increment)
1 0000
└→Carry

4) Decrement and borrow

0000
− 1······(Decrement)
1111
└→Borrow

5) Exclusive OR

0 + 0 = 0
0 + 1 = 1
1 + 0 = 1
1 + 1 = 0

6. I/O Port

Port : Point of electrical access to a system or circuit

Port	DP	Bit [( )=IC Terminal No.]				
		0	1	2	3	
A_0	0	REW switch (33)	PAUSE switch (34)		STOP switch (36)	(I_1=0, I_1=1)
A_1	0	REC switch	REV switch	FWD switch (35)	FF switch	(I_0=1, I_1=0)
B	1	HEAD FWD (37)	REV erasure-proof switch (38)	FWD erasure-proof switch (39)		
C	2	MEMORY switch STOP (2)	MEMORY switch PLAY (3)	TIMER switch REC (4)	TIMER switch PLAY (5)	
D	3	TAPE COUNTER switch (8)	MODE switch ⊃ (9)	MODE switch — (10)	SHUT OFF (11)	
E	4	REV lamp (12)	FWD lamp (13)	FF lamp (14)	REW lamp (15)	
F	5	$\overline{\text{REC MUTE}}$ (16)	$\overline{\text{PLAY MUTE}}$ (17)	PAUSE lamp (18)	REC lamp (19)	
G	6		BRAKE SOLENOID (PM2) (23)	HEAD SOLENOID (PM1) (24)	REC bias (25)	
H	7	KICK (26)	REEL MOTOR Speed Select (27)	REEL MOTOR ON/OFF (28)	CAPSTAN MOTOR ON/OFF (29)	
I	8	A SELECT (30)	$\overline{\text{A SELECT}}$ (31)	REEL MOTOR FWD/REV (32)		

Fig. 3

7. TERMINALS (Except I/O Port)

TERMINAL	TERMINAL No.	FUNCTION
CL1	(1)	CLOCK OSC OUTPUT
CL0	(42)	CLOCK OSC INPUT
INT	(6)	CAPSTAN MOTOR FG INPUT
RES	(7)	POWER ON/OFF INPUT
TEST	(20)	CONNECTED TO (21)

Fig. 4

8. RAM (Random Access Memory = Read out/Write in)

Address	0	1	2	3
¥0	REW switch	PAUSE switch		STOP switch
¥1	REC switch	REV switch	FWD switch	FF switch
¥2	HEAD FWD	REV erasure-proof switch	FWD erasure-proof switch	
¥3	MEMORY switch STOP	MEMORY switch PLAY	TIMER switch REC	TIMER switch PLAY
¥4	TAPE COUNTER switch	MODE switch ↩	MODE switch —	SHUT OFF
¥5	REV MODE	FWD MODE	FF MODE	REW MODE
¥6			PAUSE MODE	REC MODE
¥7	REC(ON/OFF)	TAPE COUNTER OFF→ON	TAPE COUNTER ON→OFF	
¥8	REC(ON/OFF)	6 COUNT		
¥A	REPEAT	6 COUNT		
¥B	FG COUNTER(High)			
¥C	FG COUNTER(Low)			
¥D	REC CHECK	FG COUNT and DATA INPUT		
¥E	INPUT ON	INPUT CHECK		
¥F	PAUSE CHECK			
¥10	DATA INPUT BUFFER (A0)・FG COUNT			
¥11	DATA INPUT BUFFER (A1)・FG COUNT			

Fig. 5

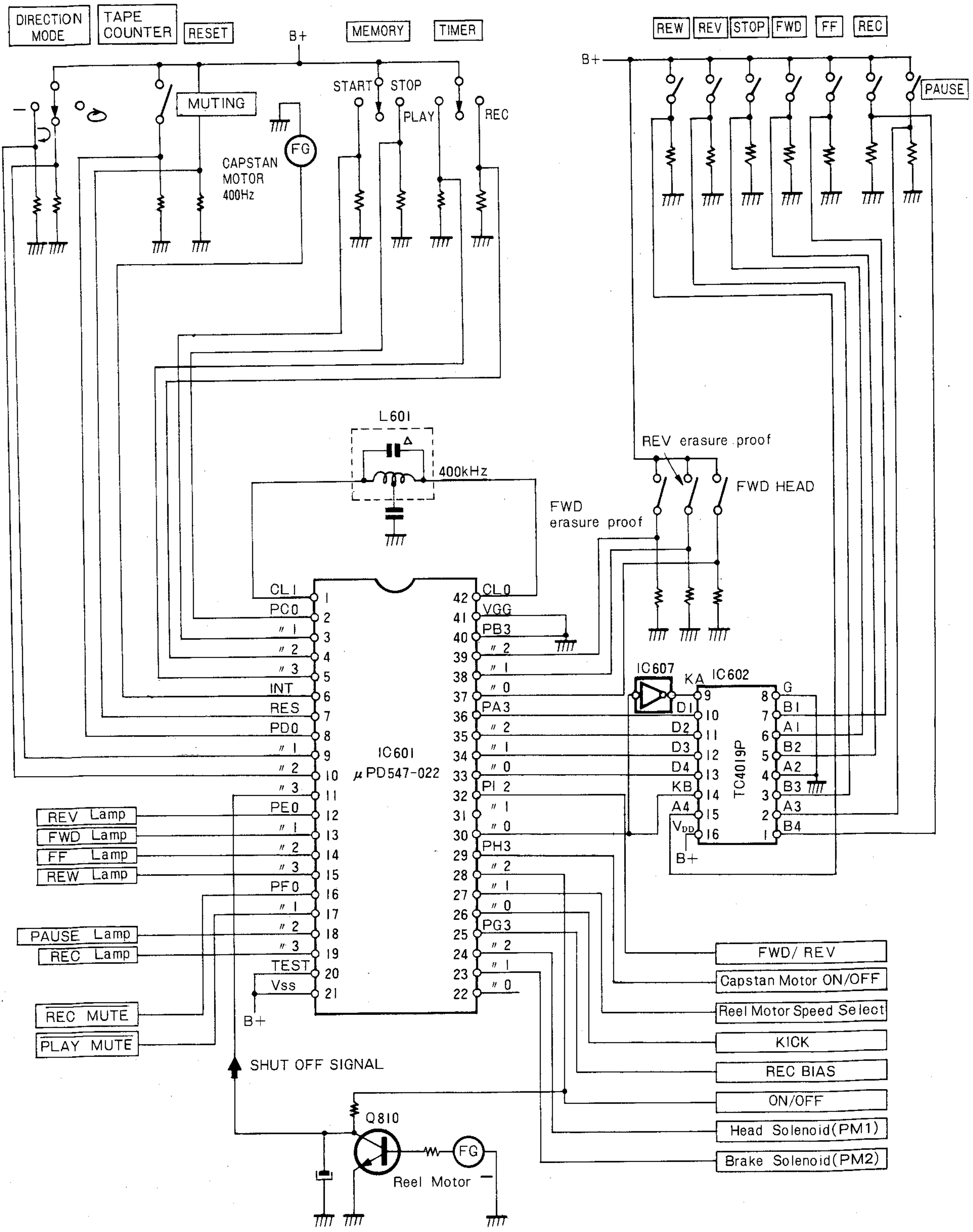

DIRECTION MODE
TAPE COUNTER
RESET
B+
MEMORY
TIMER
MUTING
START
STOP
PLAY
REC
FG
CAPSTAN MOTOR 400Hz
REW
REV
STOP
FWD
FF
REC
PAUSE
B+
L601
400kHz
REV erasure proof
FWD HEAD
FWD erasure proof
IC607
KA
IC602
TC4019P
G
B1
A1
B2
A2
B3
A3
B4
D1
D2
D3
D4
KB
A4
VDD
B+
IC601
µPD547-022
CL1
PC0
PB3
INT
RES
PD0
PE0
PF0
TEST
Vss
CL0
VGG
PA3
PI 2
PH3
PG3
REV Lamp
FWD Lamp
FF Lamp
REW Lamp
PAUSE Lamp
REC Lamp
REC MUTE
PLAY MUTE
B+
SHUT OFF SIGNAL
Q810
FG
Reel Motor
FWD/ REV
Capstan Motor ON/OFF
Reel Motor Speed Select
KICK
REC BIAS
ON/OFF
Head Solenoid(PM1)
Brake Solenoid(PM2)

Fig. 6

9. IC INPUT/OUTPUT Timing Chart in Each Operation

1. Priority in Input Multiple Button Operations

STOP > REW > FF > FWD > REV
STOP, REW, FF > REC, PAUSE

2. Input Inhibiting Condition

REC	Inhibit in REW, FF, FWD, REV
PAUSE	Inhibit in REW, FF

3. Timing Chart in Each Operation

Note: When the KICK signal has been put out at the beginning of one operation (herein, operation A), even if another operation signal (herein, operation signal B) is given it (the operation signal B) will be stored within and the operation B will be carried out after the KICK output is reset.

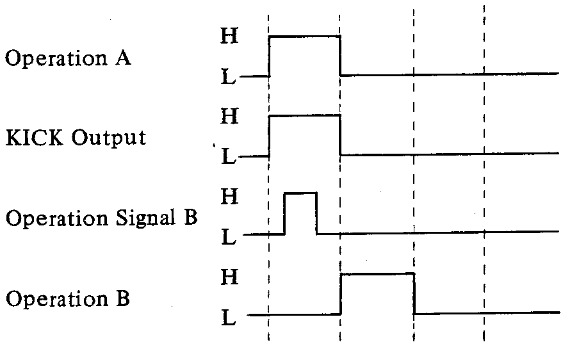
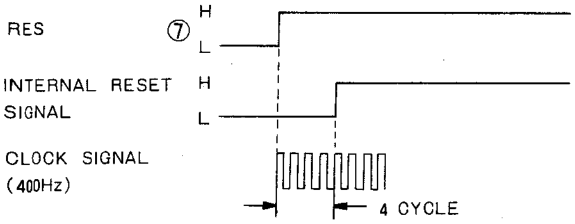


Fig. 7

The numerals in the timing chart of each part are the number of inputs of INT (FG input of the capstan motor is 400 Hz).

The encircled numbers are terminal numbers in the IC.

1) When POWER switch is turned on



After 4 cycle of clock signal, all of output terminals are reset.

Fig. 8

2) When STOP button is depressed.

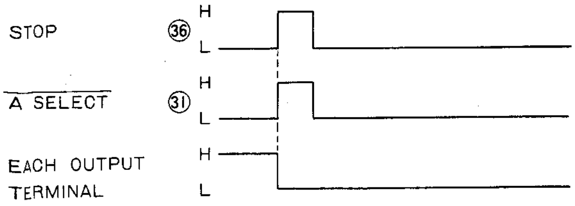


Fig. 9

3) When REW button is depressed.

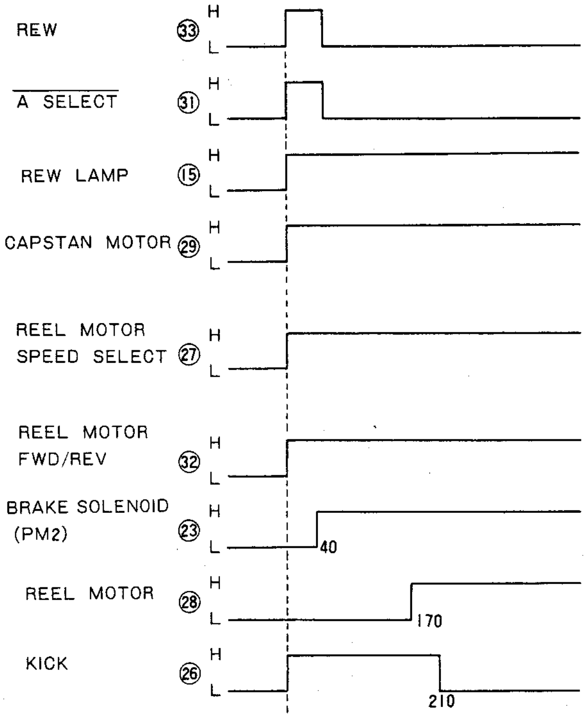


Fig. 10

4) When FF button is depressed.

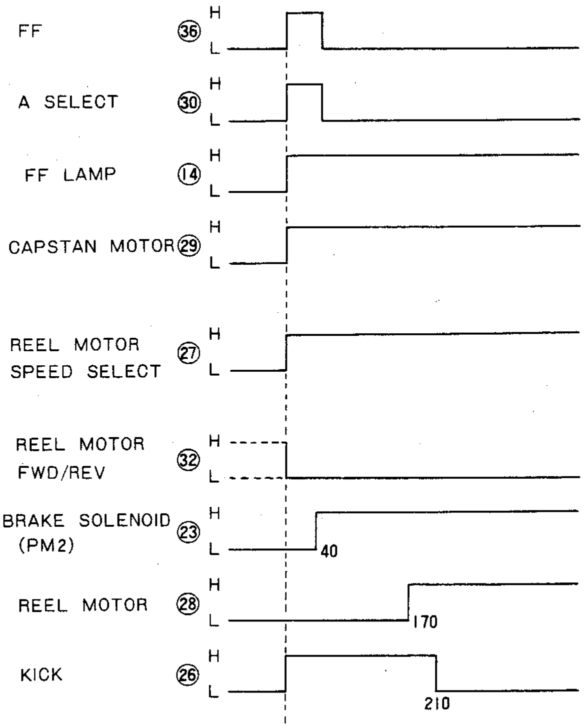


Fig. 11

5) When FWD button is depressed.

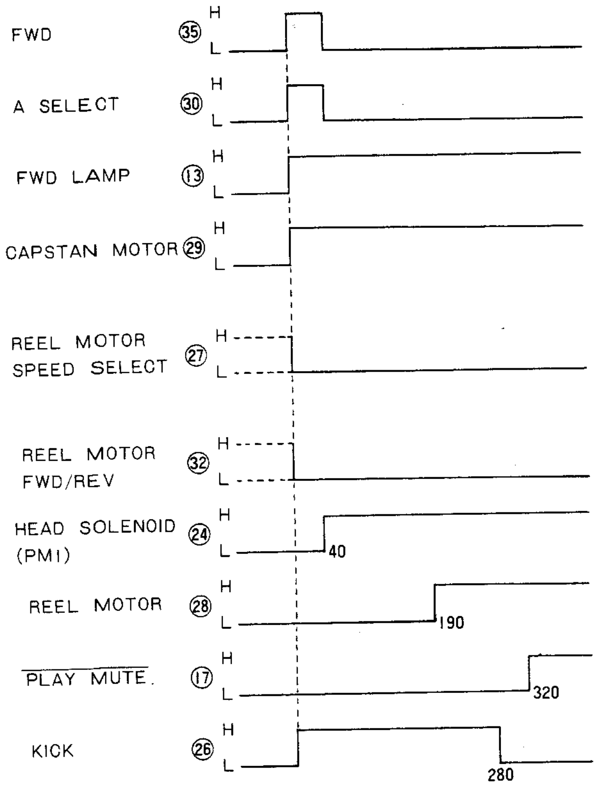

FWD ㉟
A SELECT ㉚
FWD LAMP ⑬
CAPSTAN MOTOR ㉙
REEL MOTOR SPEED SELECT ㉗
REEL MOTOR FWD/REV ㉜
HEAD SOLENOID (PM1) ㉔
REEL MOTOR ㉘
PLAY MUTE ⑰
KICK ㉖
H
L
40
190
320
280

Fig. 12

6) When REV button is depressed.

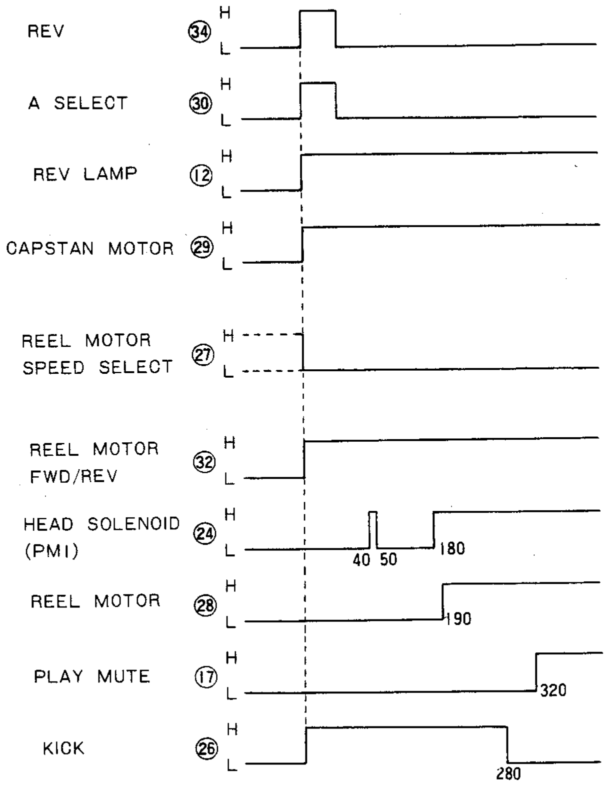

REV ㉞
A SELECT ㉚
REV LAMP ⑫
CAPSTAN MOTOR ㉙
REEL MOTOR SPEED SELECT ㉗
REEL MOTOR FWD/REV ㉜
HEAD SOLENOID (PM1) ㉔
REEL MOTOR ㉘
PLAY MUTE ⑰
KICK ㉖
H
L
40
50
180
190
320
280

Fig. 13

7) When REC button is depressed.

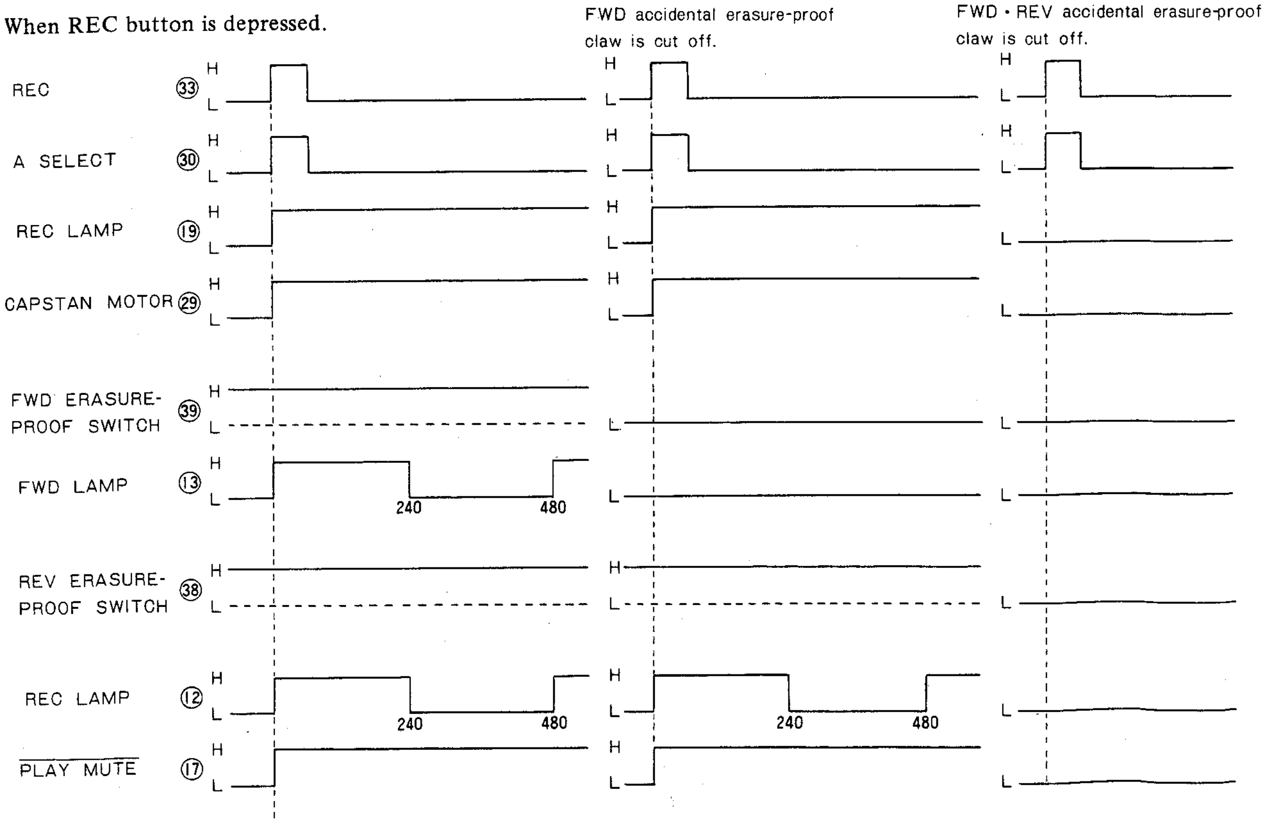

FWD accidental erasure-proof claw is cut off.
FWD • REV accidental erasure-proof claw is cut off.
REC ㉝
A SELECT ㉚
REC LAMP ⑲
CAPSTAN MOTOR ㉙
FWD ERASURE-PROOF SWITCH ㊴
FWD LAMP ⑬
REV ERASURE-PROOF SWITCH ㊳
REC LAMP ⑫
PLAY MUTE ⑰
H
L
240
480

Fig. 14

8) When REC·FWD button is depressed.

When REC • REV button is depressed in PAUSE mode.

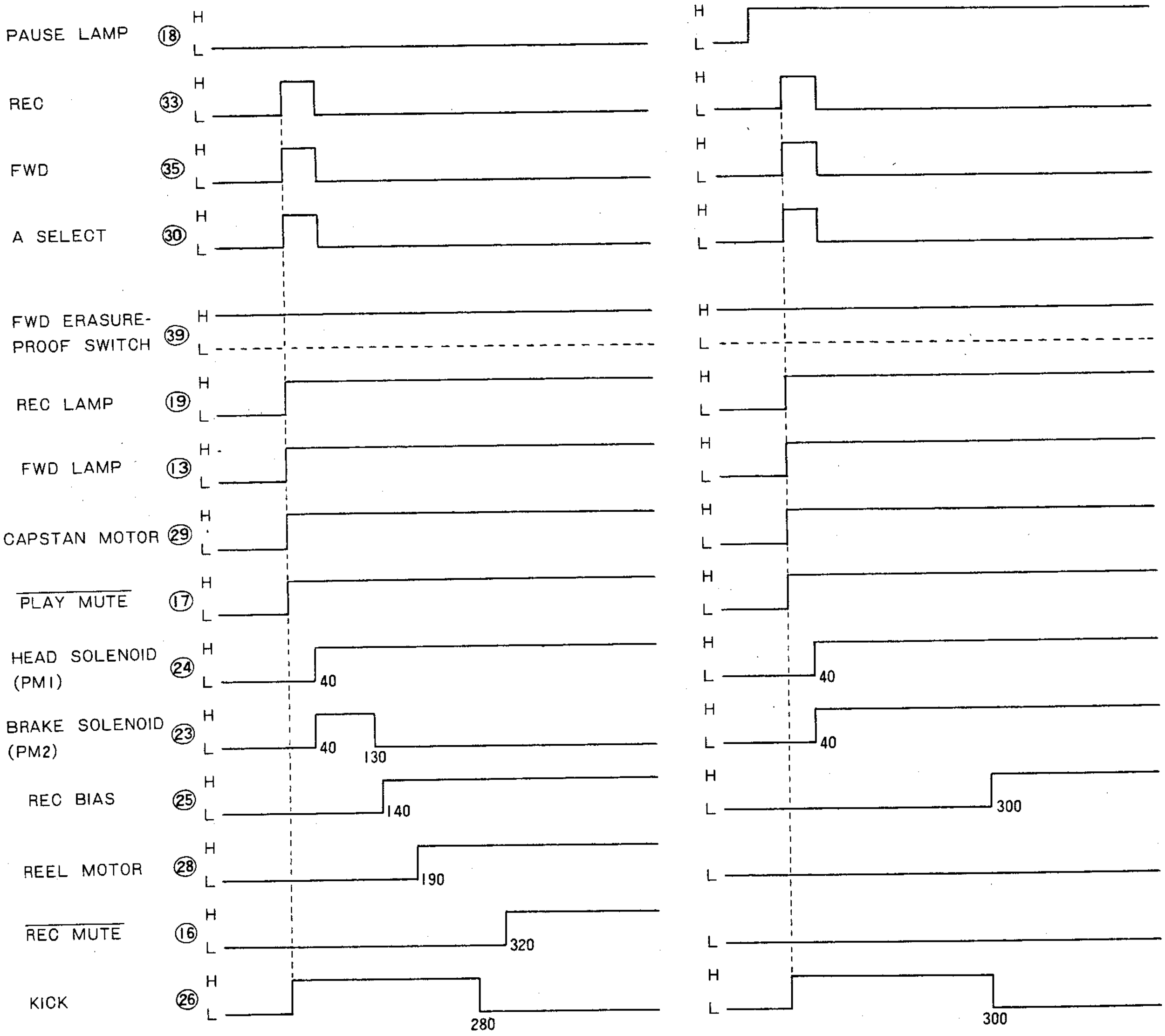

PAUSE LAMP ⑱
REC ㉝
FWD ㉟
A SELECT ㉚
FWD ERASURE-PROOF SWITCH ㊴
REC LAMP ⑲
FWD LAMP ⑬
CAPSTAN MOTOR ㉙
PLAY MUTE ⑰
HEAD SOLENOID (PM1) ㉔
BRAKE SOLENOID (PM2) ㉓
REC BIAS ㉕
REEL MOTOR ㉘
REC MUTE ⑯
KICK ㉖
H
L
40
40
130
140
190
320
280
40
40
300
300

Fig. 15

9) When REC•REV button is depressed.

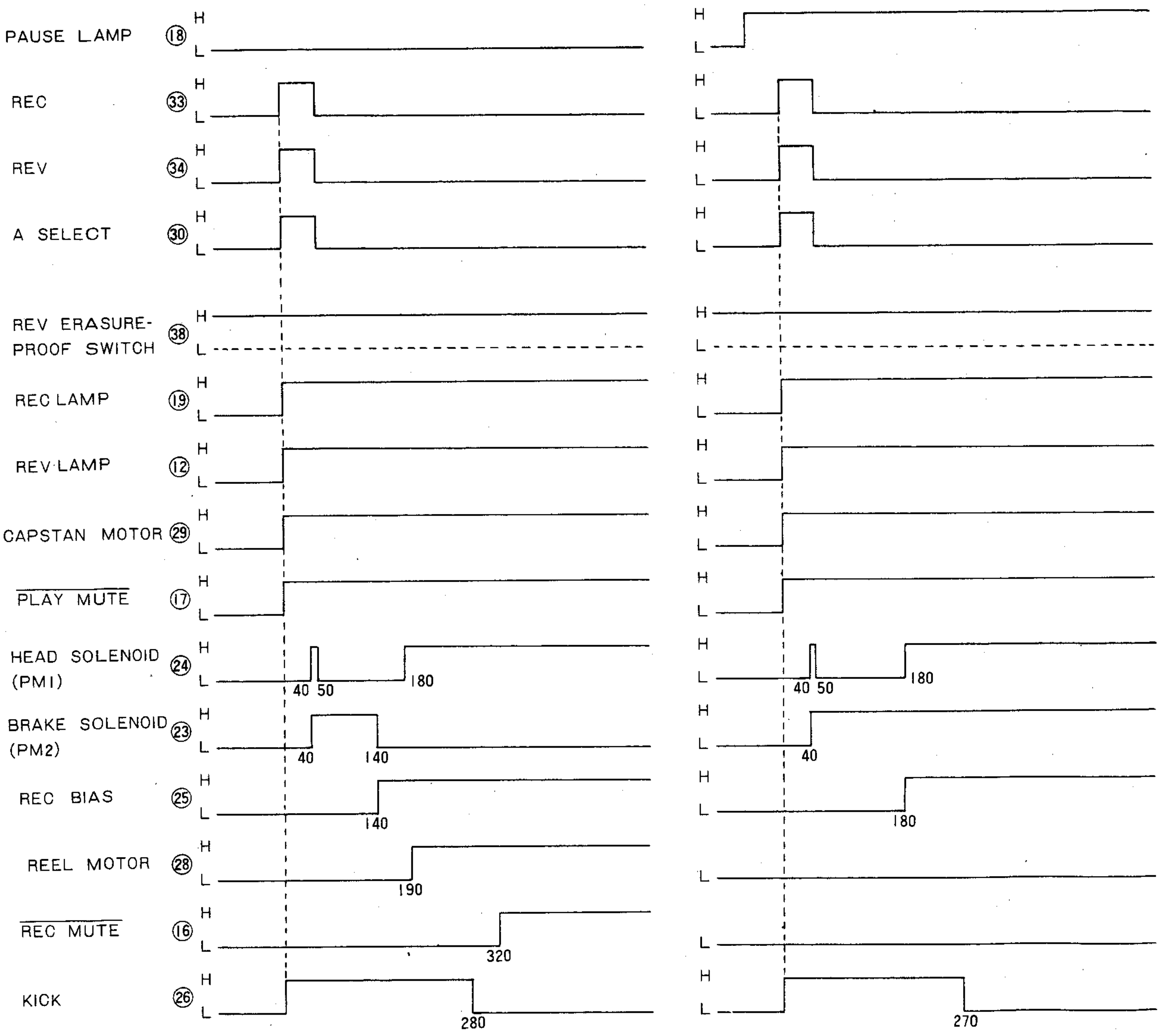

When REC•FWD button is depressed in PAUSE mode.
PAUSE LAMP ⑱
REC ㉝
REV ㉞
A SELECT ㉚
REV ERASURE-PROOF SWITCH ㊳
REC LAMP ⑲
REV LAMP ⑫
CAPSTAN MOTOR ㉙
PLAY MUTE ⑰
HEAD SOLENOID (PM1) ㉔
BRAKE SOLENOID (PM2) ㉓
REC BIAS ㉕
REEL MOTOR ㉘
REC MUTE ⑯
KICK ㉖
H
L
40 50
180
40
140
140
190
320
280
40
180
270

Fig. 16

10) When PAUSE button is depressed.

(a) Depress PAUSE button in STOP mode.

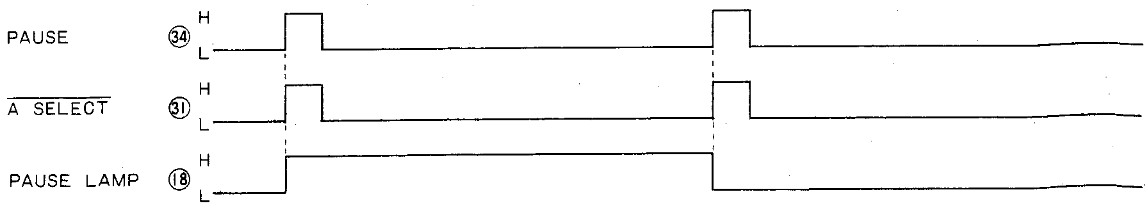

When PAUSE button is released.
PAUSE ㉞
A SELECT ㉛
PAUSE LAMP ⑱
H
L

Fig. 17

(b) Deress PAUSE button in FWD, REW, REW · FWD or REC · REV mode.

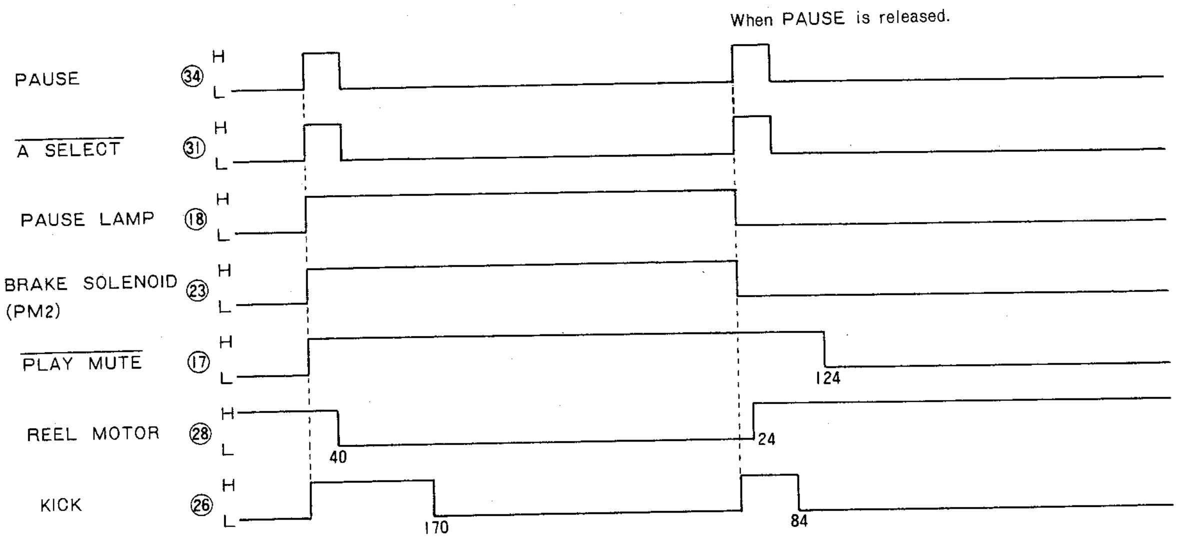

When PAUSE is released.
PAUSE ㉞
A SELECT ㉛
PAUSE LAMP ⑱
BRAKE SOLENOID (PM2) ㉓
PLAY MUTE ⑰
REEL MOTOR ㉘
KICK ㉖
H
L
124
40
24
170
84

Fig. 18

11) When FWD or REV button is depressed in PAUSE mode.

(a) When FWD button is depressed.

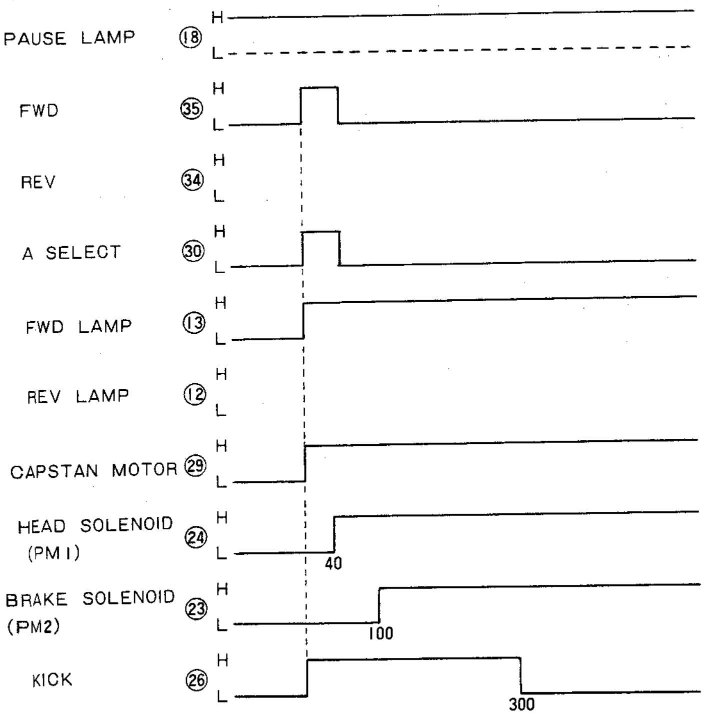

PAUSE LAMP ⑱
FWD ㉟
REV ㉞
A SELECT ㉚
FWD LAMP ⑬
REV LAMP ⑫
CAPSTAN MOTOR ㉙
HEAD SOLENOID (PM1) ㉔
BRAKE SOLENOID (PM2) ㉓
KICK ㉖
H
L
40
100
300

Fig. 19

(b) When REV button is depressed.

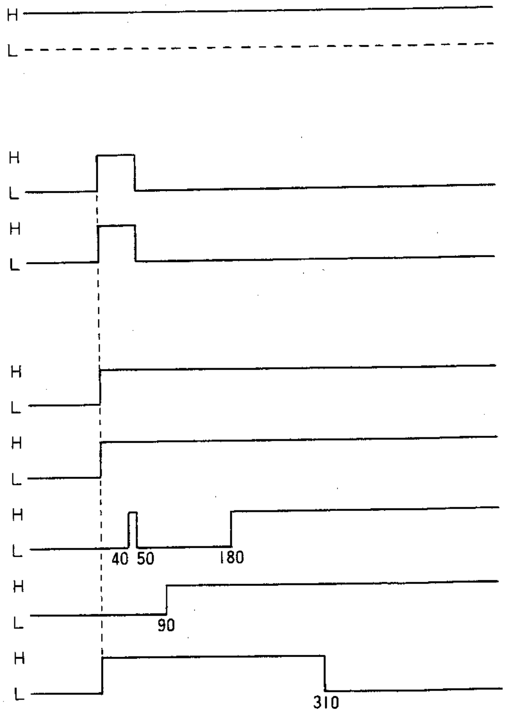

H
L
40
50
180
90
310

Fig. 20

12) MEMORY switch

When the tape counter indicates "999" from "000" or "000" from "999" during FF or REW mode, the set stops or starts to play.

(a) Depress REW button in FWD mode.

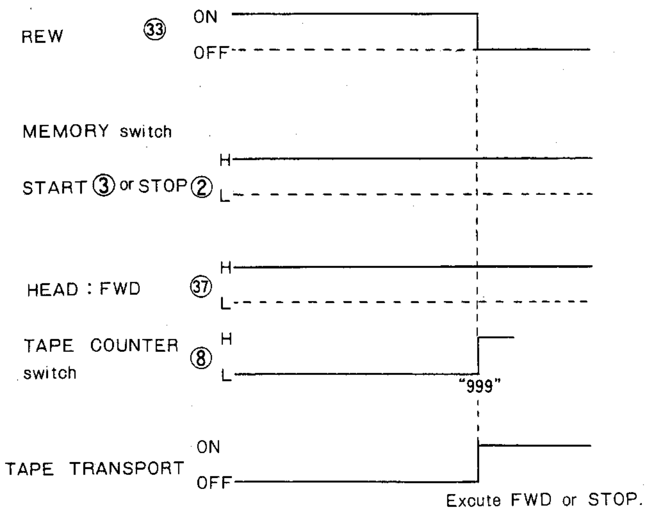

REW
㉝
ON
OFF
MEMORY switch
START ③ or STOP ②
H
L
HEAD : FWD
㊲
H
L
TAPE COUNTER switch
⑧
H
L
"999"
TAPE TRANSPORT
ON
OFF
Excute FWD or STOP.

Fig. 21

(b) Depress FF button in REV mode.

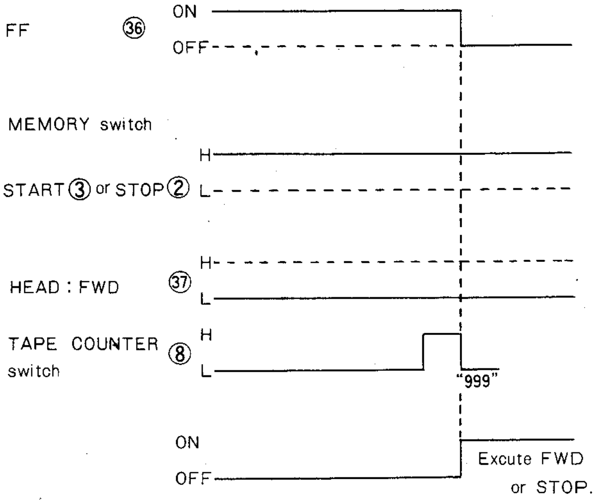

FF
㊱
ON
OFF
MEMORY switch
START ③ or STOP ②
H
L
HEAD : FWD
㊲
H
L
TAPE COUNTER switch
⑧
H
L
"999"
ON
OFF
Excute FWD or STOP.

Fig. 22

13) SHUT OFF

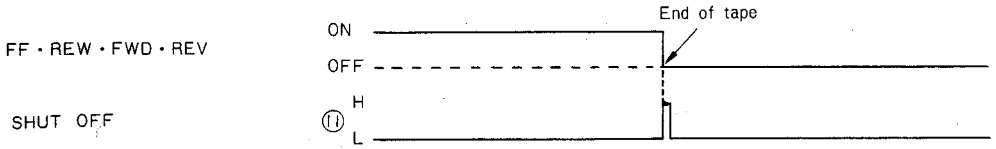

FF • REW • FWD • REV
ON
OFF
End of tape
SHUT OFF
⑪
H
L

Fig. 23

14) MODE switch select.

(a) MODE switch : —— position

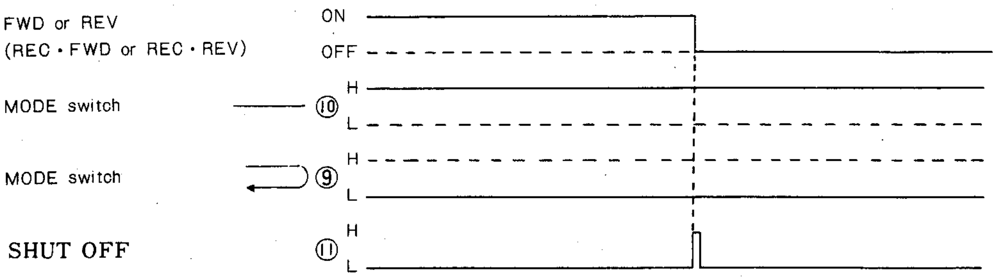

FWD or REV
(REC • FWD or REC • REV)
ON
OFF
MODE switch
⑩
H
L
MODE switch
⑨
H
L
SHUT OFF
⑪
H
L

Fig. 24

(b) MODE switch : ⊃ position

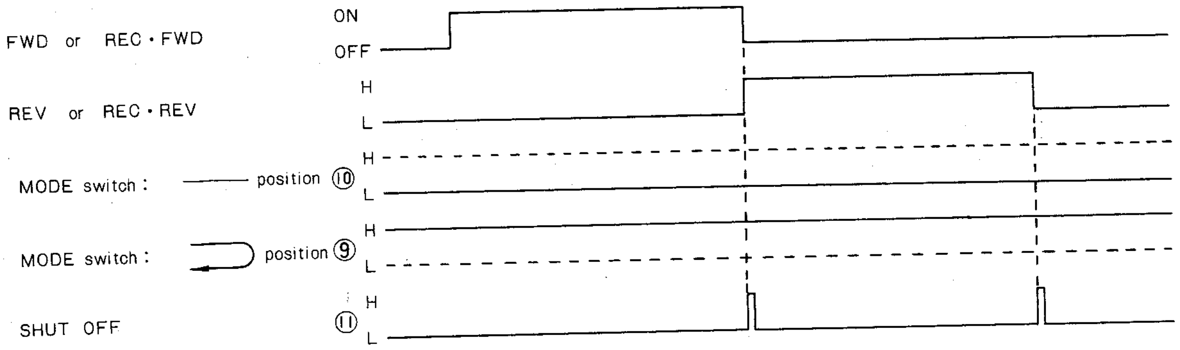


Fig. 25

(c) MODE switch : ⟲ position

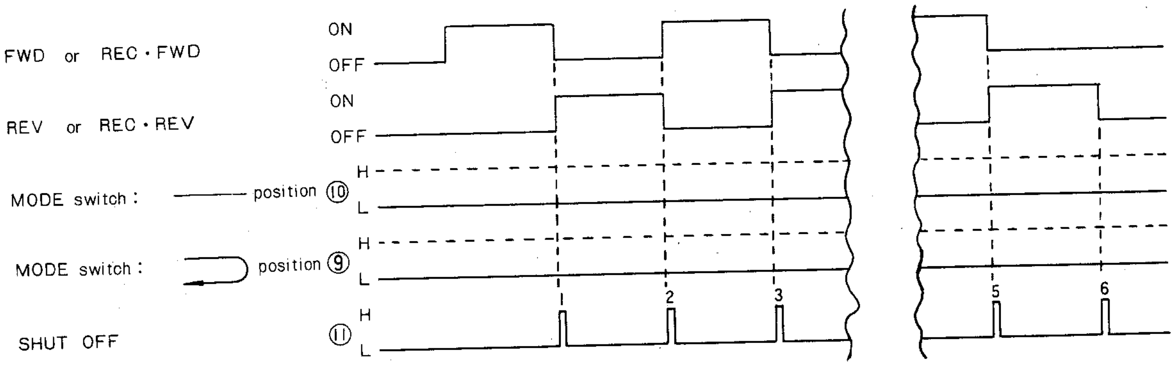


Fig. 26

15) TIMER·REC or TIMER·PLAY

(a) TIMER · REC

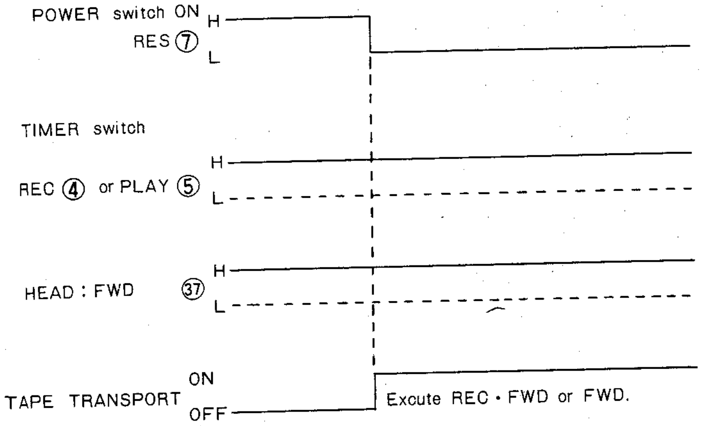


Fig. 27

(b) TIMER · PLAY

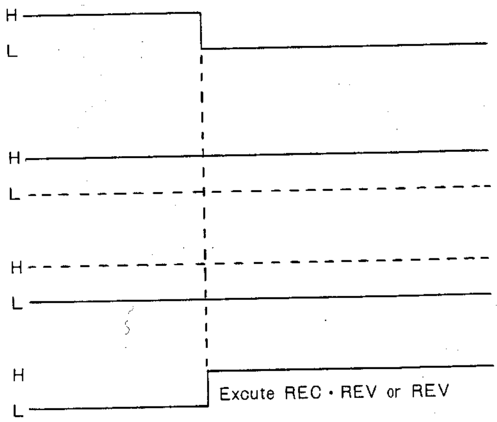
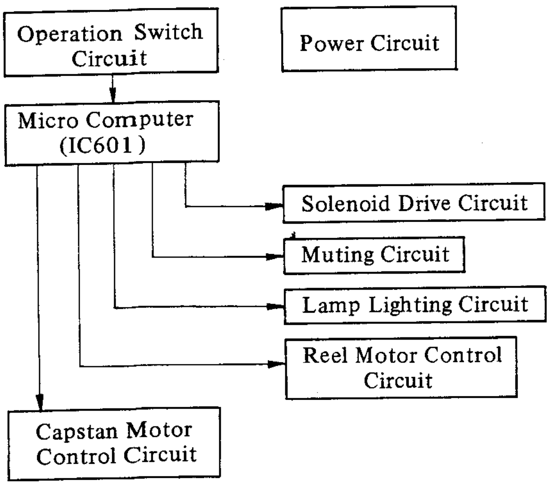


Fig. 28

10. SYSTEM CONTROL CIRCUIT

An outline of the micro computer was given in Chapter 1 ~ 3. An explanation of the system control circuit of this device will now be given.

The system control circuit in this device is composed of the following blocks built around the micro-computer (IC601).


Operation Switch Circuit
Power Circuit
Micro Computer (IC601)
Solenoid Drive Circuit
Muting Circuit
Lamp Lighting Circuit
Reel Motor Control Circuit
Capstan Motor Control Circuit

The IC601 sends out the output signals of ON (HIGH)/OFF (LOW) to each block corresponding to the input signals from the operation switches or from the reel or capstan motor control circuits.

An explanations of each of the blocks follows:

1) FUNCTION Switch Circuit

(a) The signals for the five operations of REW, REV, STOP, FWD, FF are sent our on two lines from the FUNCTION switches. The priority level is determined by the switch arrangement and the resistor values.

The OP amplifier in Fig. 29 is employed as a comparator circuit. When the switch is off, because the potential of the (–) terminal is higher than that of the (+) terminal in the OP amplifier input, the output of the OP amplifier goes to the low potential level.

Next, when the switch is on, because the potential of the (+) terminal is higher than that of (–) terminal, the output of the OP amp goes to HIGH.

Here five OP amplifiers are combined and the voltages of the (–) terminals of the OP amplifiers are compared when the switches are pressed and then the mode of operation is decided.

(Example) When STOP switch (S12) is pressed: When S12 is pressed, the outputs of IC1~5 go HIGH. However, since Q624~627 are turned on, the outputs of IC1~4 will be muted, and only the output of IC5 (STOP signal) will be effective output.

(1) Drive Table for IC1~5, Q624~627

(2) (When IC output is high-potential ⇒ 0) When it is low-potential → X

Switch	IC1	IC2	IC3	IC4	IC5	Q624	Q625	Q626	Q627
STOP	0	0	0	0	0	ON	ON	ON	ON
REW	0	0	0	0	X	OFF	ON	ON	ON
FF	0	0	0	X	X	OFF	OFF	ON	ON
FWD	0	0	X	X	X	OFF	OFF	OFF	ON
REV	0	X	X	X	X	OFF	OFF	OFF	OFF

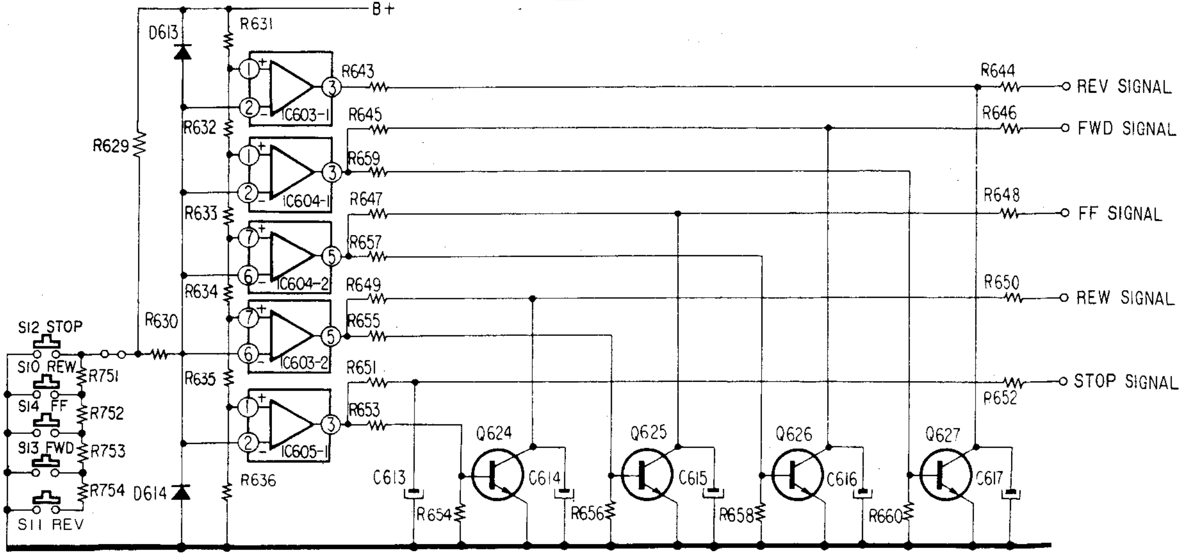
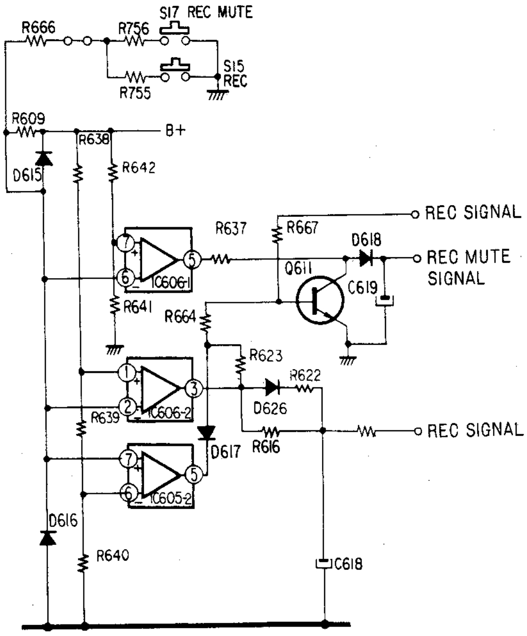

B+
D613
R631
R643
R644
REV SIGNAL
IC603-1
R645
R646
FWD SIGNAL
R632
R629
R659
IC604-1
R647
R648
FF SIGNAL
R633
R657
IC604-2
R634
R649
R650
REW SIGNAL
S12 STOP
R630
R655
IC603-2
S10 REW
R751
R635
R651
STOP SIGNAL
R652
S14 FF
R752
R653
IC605-1
Q624
Q625
Q626
Q627
S13 FWD
R753
R754
D614
R636
C613
C614
C615
C616
C617
R654
R656
R658
R660
S11 REV

Fig. 29

(b) The modes of REC and REC MUTE in recording are determined by the OP amplifiers as in (a). (Fig. 30)

- When the REC MUTE switch (S17) is pushed, the output of IC6 goes HIGH generating the REC MUTE signal.
- When the REC switch (S15) is pushed, the outputs of IC6.7 go HIGH. However, since Q611 is turned on, the output of IC6 is muted, and only the REC signal is output.
- When the REC switch (S15) and REC MUTE switch (S17) are simultaneously pushed, outputs of IC6.7 go HIGH, and the output of IC8 goes LOW. Therefore, the REC MUTE signal, which has been muted by Q611 during recording will have its muting condition released because Q611 is turned off by D617 IC8.

(c) The PAUSE circuit operates independently by switching Q631 in order to prevent chattering.



S17 REC MUTE
R666
R756
R755
S15 REC
R609
R638
B+
D615
R642
REC SIGNAL
R637
R667
D618
REC MUTE SIGNAL
Q611
C619
IC606-1
R641
R664
R623
R622
IC606-2
D626
R639
D617
R616
REC SIGNAL
IC605-2
D616
R640
C618

Fig. 30

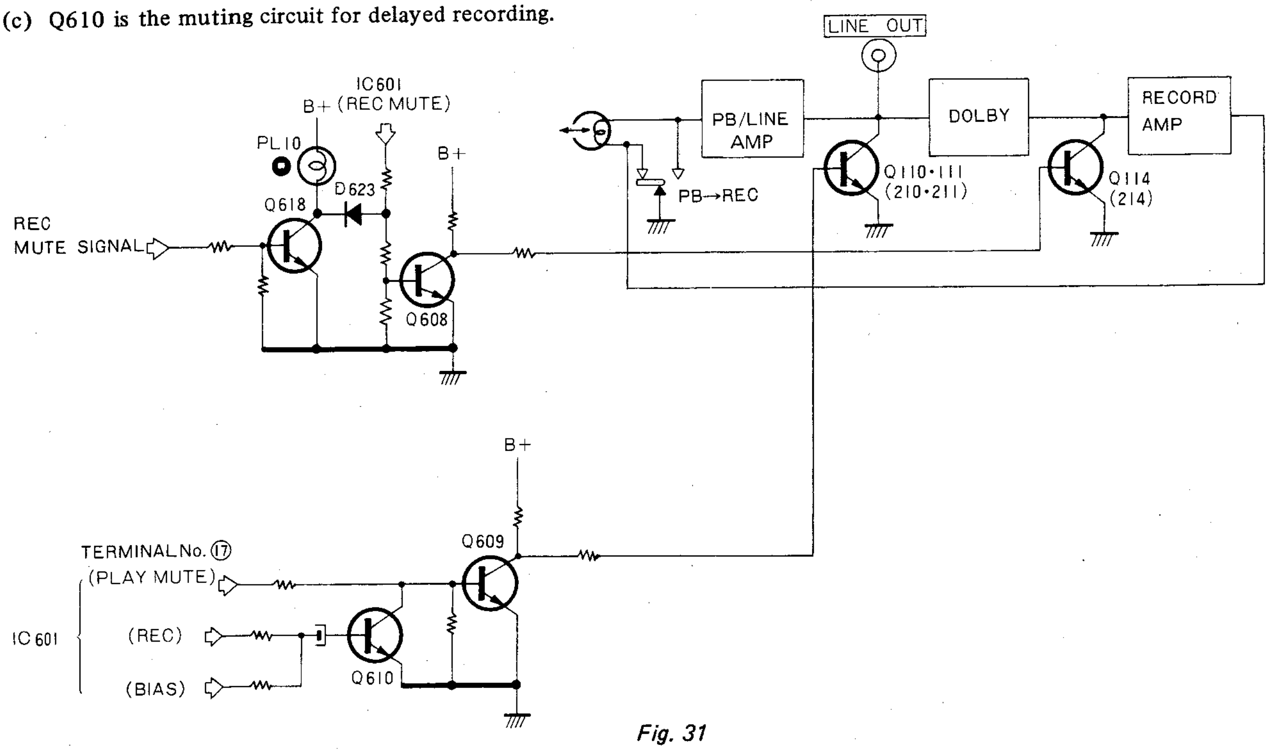
2) Muting Circuit

(a) In the STOP, FF and REW modes, since PLAY MUTE of IC601 goes LOW. Q609 will be turned off, the muting signal will be applied to Q110.111 (210, 211), and LINE OUT will be muted.

(b) In FWD.REV, since PLAY MUTE of IC601 goes HIGH, Q609 is turned off, and the muting will be cancelled.

(c) Q610 is the muting circuit for delayed recording.

(d) Q618 is turned on by the REC MUTE signal from the operation switch circuit, and PL10 lights up.
Further, since Q618 goes on, and the REC MUTE signal from IC601 goes grounded via D623, Q603 will be turned off, and because the REC MUTE signal gets applied to Q114(214), consequently the recording signal will be muted.



LINE OUT
IC601
B+ (REC MUTE)
PL10
B+
D623
Q618
REC MUTE SIGNAL
Q608
PB/LINE AMP
PB→REC
DOLBY
Q110·111 (210·211)
RECORD AMP
Q114 (214)
B+
TERMINAL No. ⑰
(PLAY MUTE)
IC601
(REC)
(BIAS)
Q609
Q610

Fig. 31

3) Power Circuit, Solenoid drive

(a) Reset when the power switch is turned on or off

- When the power switch is turned on: for three seconds when the supply voltage charges C624 through R703, the Schmitt circuit formed by the inverters (IC602) operates and sends the reset signal to IC601.
- When the power switch is turned off: because C624 discharges due to the fall in the primary voltage, the Schmitt circuit operates and sends the reset signal to IC601.

(b) The solenoids (PM1,2) are driven by the signals PM1, PM2 from IC601, via the Darlington amplification circuits of Q619, 620, Q621, 622. The solenoids are driven by HIGH voltage level only while retracting because Q607, 606 are turned on by the KICK signal sent simultaneously with the signals PM1, PM2. This is to prevent excessive heat generation.

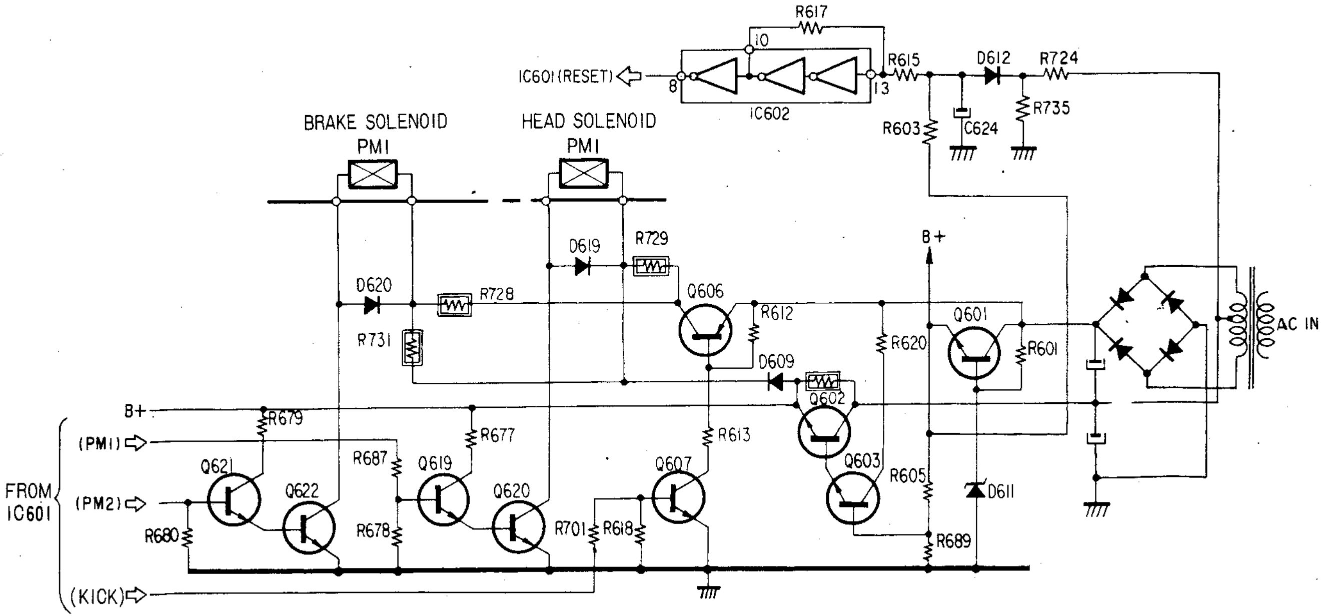

R617
10
IC601(RESET)
8
13
IC602
R615
D612
R724
R735
R603
C624
BRAKE SOLENOID
PM1
HEAD SOLENOID
PM1
D619
R729
B+
D620
R728
Q606
R612
Q601
AC IN
R731
R620
R601
D609
Q602
B+
R679
(PM1)
R677
R613
R687
Q619
Q607
Q603
FROM IC601
Q621
Q622
Q620
R605
D611
(PM2)
R680
R678
R701
R618
R689
(KICK)

Fig. 32

4) Capstan Motor FG Signal Circuit

The FG frequency of the capstan motor is 133 Hz. For this purpose, pulses are generated by Q806, 807 at the rise and fall of the output waveform at terminal No.2 of IC801. Further, the motor output signal $\phi 1$ is wave-shaped in the comparison circuit of the operational amplifier (IC804), and pulses are generated at its riging edge. These pulses are added producing pulses with three times the frequency (about 400 Hz) from the fundamental FG frequency (133 Hz).

The FG pulses of 400 Hz generated in the servo circuit are used as the fundamental frequency for IC601 (micro-computer) after being shaped and adjusted in time phase by a Schmitt circuit mode up of inverters.

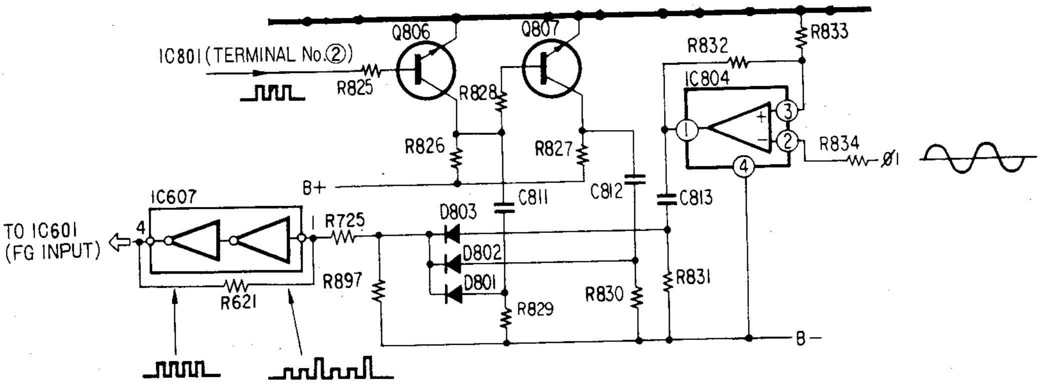


Fig. 33

5) Reel Motor Control Circuit

The OP amplifier (IC804) generates output voltages of positive, 0, negative with respect to the virtual ground this is not chassis ground, but has a potential of +10V). As a result, the reel motor (BSL) rotates in the forward or reverse directions in accordance with the output potential of the OP amplifier.

(a) FWD/REV Switching of the Reel Motor

Due to the reel motor signal FWD/REV from IC601, Q809 will be turned off in FWD and FF modes, B + is applied to the (+) terminal of IC804, and the output of the OP amplifier becomes positive.

Next, in the REV and REW modes, because Q809 is turned on, the potential of the (+) terminal of IC804 becomes lower than that of (−) terminal, and the output of the OP amplifier goes negative. As a result, by turning on or off Q809, the rotating direction of the reel motor will be reversed.

(b) ON/OFF Switching for Reel Motor

When the reel motor is off, Q811 is turned on due to the signal ON/OFF of the reel motor, so that the output of the OP amplifier becomes 0 volts, and the reel motor does not rotate.

(c) Magnetic Brake in FF/REW of Reel Motor

When the reel motor is rotating, C814 is charged to B+ or B−. Because this capacitor discharges to imaginary ground when the reel motor stops (Q811 = ON), a voltage opposite in polarity to that during rotation will be applied to the (+) terminal of the OP amplifier.

Consequently, the reel motor tries to rotate in the opposite direction, and hence this operates as a brake which stops quickly the rotation in the FF;REW modes.

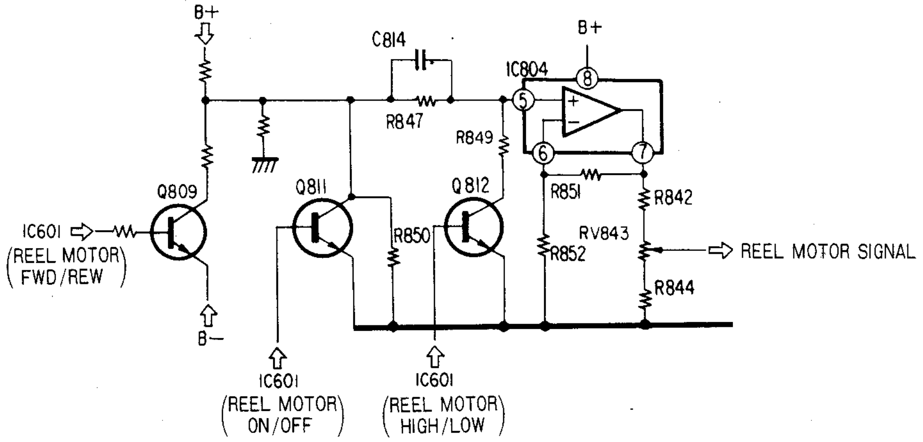

B+
C814
B+
IC804
8
5
6
7
R847
R849
Q809
Q811
Q812
R851
R842
IC601
REEL MOTOR FWD/REW
R850
RV843
R852
REEL MOTOR SIGNAL
R844
B−
IC601
REEL MOTOR ON/OFF
IC601
REEL MOTOR HIGH/LOW

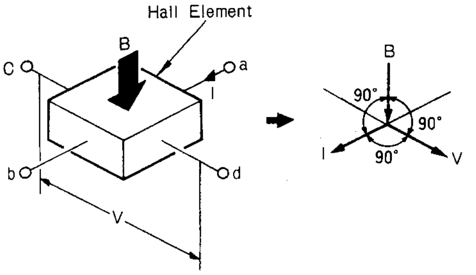
Fig. 34

6) BSL (brush and slotless) motor

(a) The BSL motor, which employs the hall element as an electronic switcher, has the low noise and the stable performance.

Hall Element:
The magnetic field strength is converted into electrical signals by employing the Hall Effect.
Hall Effect:
When a metal strip is placed with its plane perpendicular to a magnetic field and an electric current flows longitudinally through the strip, a potential difference is developed across the strip at right angles to the current flow and to the magnetic field.
The potential is proportional to amounts of the current and a strength of the magnetic field.

(b) BSL motor and its drive circuit.
The motor magnet is magnetized in 8 poles (sinusoidal patterns).
The constant current I is supplied to the hall element H1.
When the H1 comes to the N pole of the magnet, the voltage is generated in the H1.
This voltage is fed to IC803-1 and Q815 turns on.
Therefore, the current $\phi 1$ is supplied to the motor coils through Q815.
At this moment, by the Fleming's left-hand rule, the magnetic force (F) is produced in the motor coils.
And the magnet rotates in the opposite direction of the magnetic force, since the motor coils are fixed.


Hall Element
B
c
a
I
b
d
V
B
90°
90°
90°
I
V

When the current I flows through the hall element (a–b), the potential V is developed across c–d.

Fig. 35

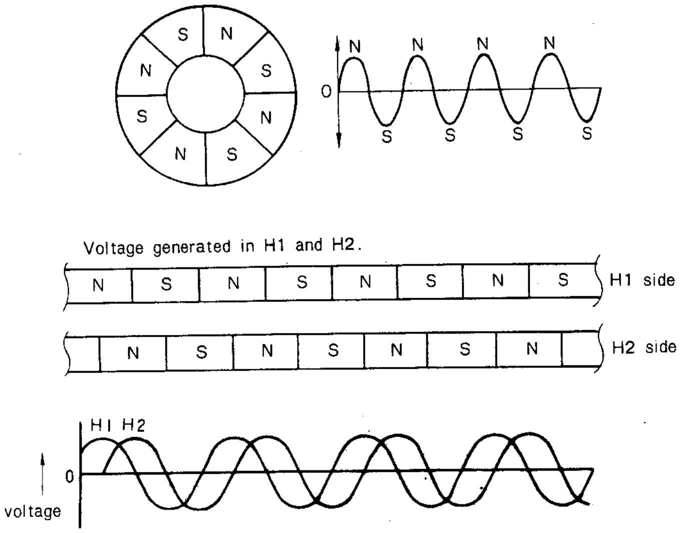

S
N
N
S
S
N
N
S
N
N
N
N
0
S
S
S
S
Voltage generated in H1 and H2.
N S N S N S N S
H1 side
N S N S N S N
H2 side
H1 H2
0
voltage

Fig. 36

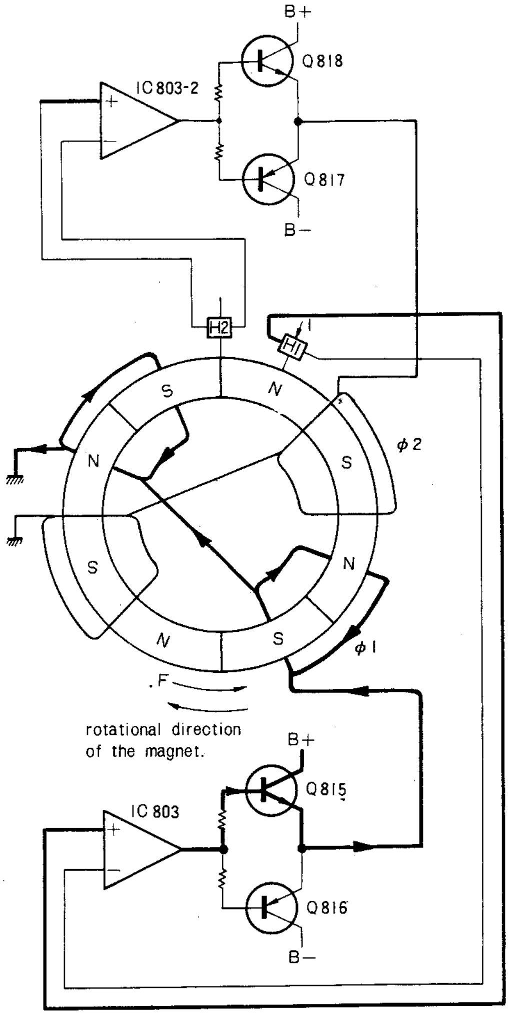

B+
Q818
IC803-2
+
−
Q817
B−
H2
H1
I
S
N
N
S
φ2
S
N
N
S
φ1
.F
rotational direction of the magnet.
B+
Q815
IC 803
+
−
Q816
B−

Fig. 37

Sony Corporation
Consumer Products Group
Technical Support Dept.

English
83D0205-5
Printed in Japan
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STEREO CASSETTE DECK

TC-K96R

US Model
Canadian Model
AEP Model
UK Model
E Model

SUPPLEMENT

File this supplement with the service manual.

No. 2
November, 1979

① The photo-coupler circuit has been added to improve the auto shut-off mechanism.

ADDED PARTS

Ref. No.	Part No.	Description
	♠ 1-602-215-00	Printed Circuit Board, photo-interrupter
D1001	8-719-101-11	SR110
D1002	8-719-815-55	1S1555
Q1001	8-729-101-13	PH103
Q1002	8-729-663-47	2SC1364

CHANGED PARTS

Ref. No.	Description	Part No.	
		Former Part	New Part
	Bracket, tape counter	♠ 3-558-330-00	♠ 3-558-486-00
S24	Tape Counter, w/switch	1-548-526-00	1-548-526-21

- Items marked "♠" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

② The auto shut-off mechanism is supplied as the kit specified below.

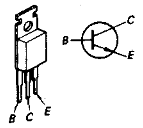
Description	Part No.
photo-coupler kit	X-3558-342-1

SONY®
SERVICE MANUAL

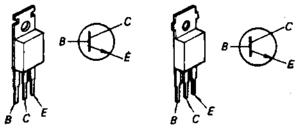
- **Replacement Semiconductors**

  For replacement, use semiconductors except in (   ).

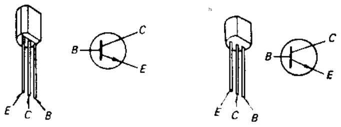
Q601 : 2SC1173



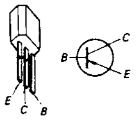
Q602 : 2SC1061 (2SC1419)



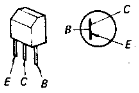
Q603, 607~619
Q621, 624~627
Q629, 631
Q801, 808, 810
Q820, 821
} 2SC1364 (2SC1634)



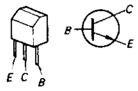
Q604 : 2SA678



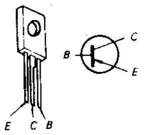
Q605, 606 : 2SB605



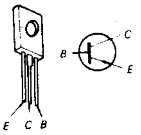
Q620, 622
Q628
} 2SD571



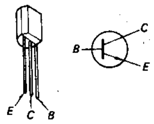
Q803, 804
Q816, 817
} 2SB548



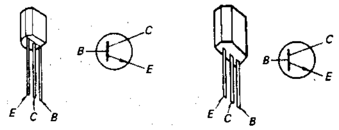
Q802, 805
Q815, 818
} 2SD414



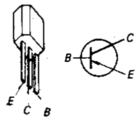
Q806, 807
Q809, 813
} 2SC1364 (2SC945)



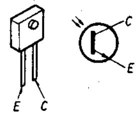
Q811, 812 : 2SC1364 (2SC634A)



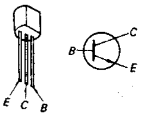
Q814, 819 : 2SA678 (2SA677)



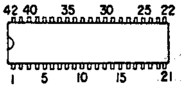
Q1001 : PH103



Q1002: 2SC1364

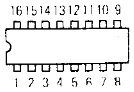


IC601 : μPD547-022


42 40 35 30 25 22
1 5 10 15 21

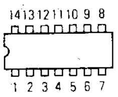
(Top view)

IC602 : TC4019P


16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8

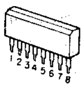
(Top view)

IC607 : TC4069P

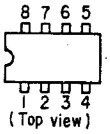

14 13 12 11 10 9 8
1 2 3 4 5 6 7

(Top view)

IC801 : CX065A



IC603~606 : μPC4557C (μPC4557)
IC802~804 : μPC4558C(μPC4558)

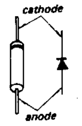


(Top view)

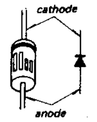
D601~604, 607
D609, 619, 620
} 10E2

D801~809
D612~618
D622, 623, 626
} 1S1555

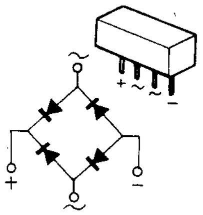
D627 : 1S1555 (1T40)


cathode
anode

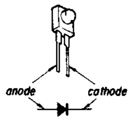
D608 : EQB01-15 (EQA01-15R)
D611 : EQB01-11Z (EQA01-11R)


cathode
anode

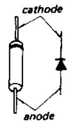
D605, 606 : S1VB10



D1001 : SR110


anode
cathode

D1002; 1S1555


cathode
anode

Seite 2 und 3 leer

SCHEMATIC DIAGRAM –System Countrol Section–

(pages 24-26 of the service manual)

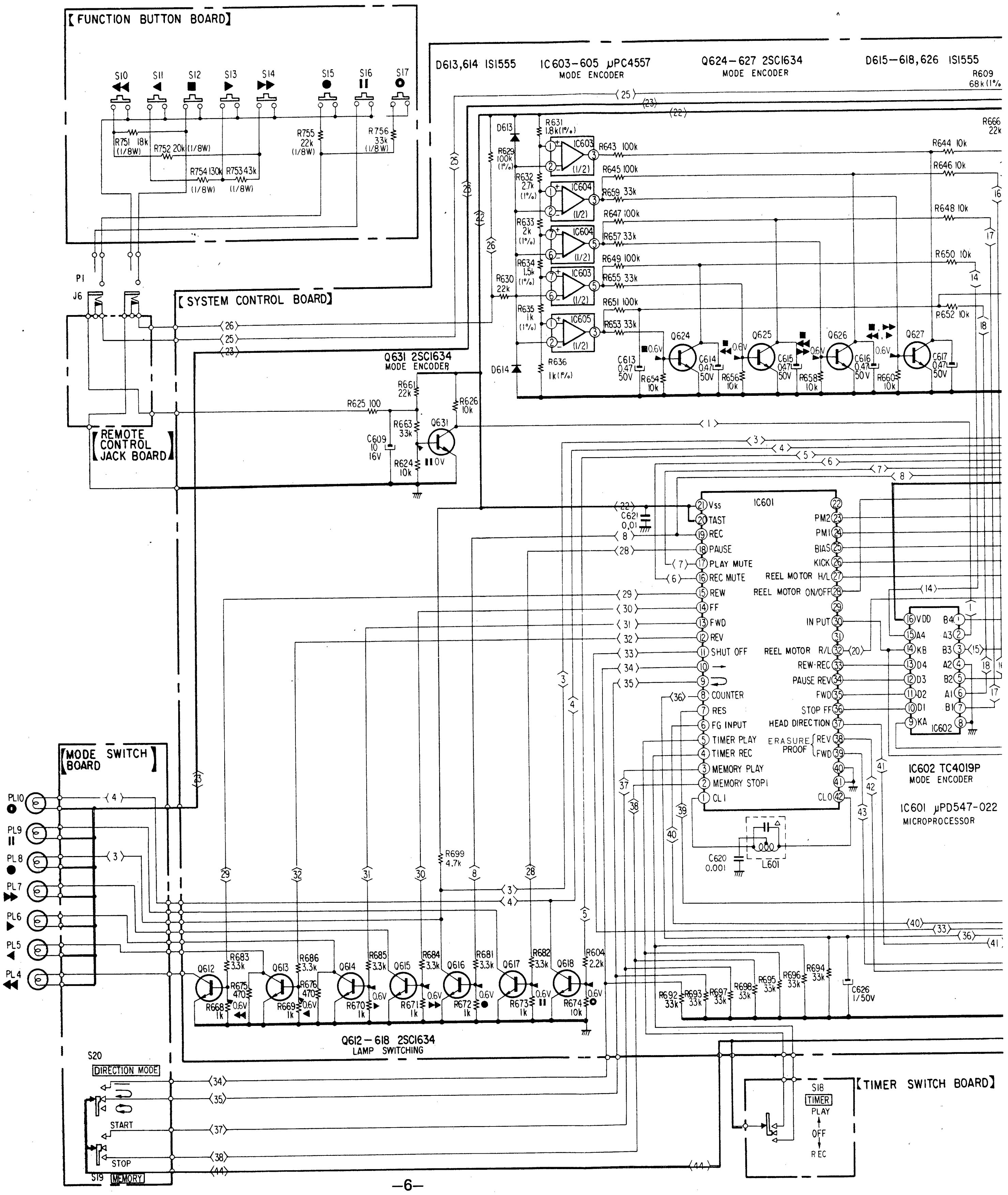
- ☐ : added portion
- All capacitors are in µF unless otherwise noted. pF = µµF 50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ = 1000Ω, MΩ = 1000 kΩ
- ☐ : panel designation
- ▭ : nonflammable resistor.
- (N) : low-noise resistor.
- ━━ : B + bus.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).
  - ◀◀ : Rewind
  - ◀ : Reverse
  - ▶ : Forward
  - ▶▶ : Fast Forward
  - ● : record
  - ❚❚ : pause
  - ◉ : rec mute
  - ■ : stop

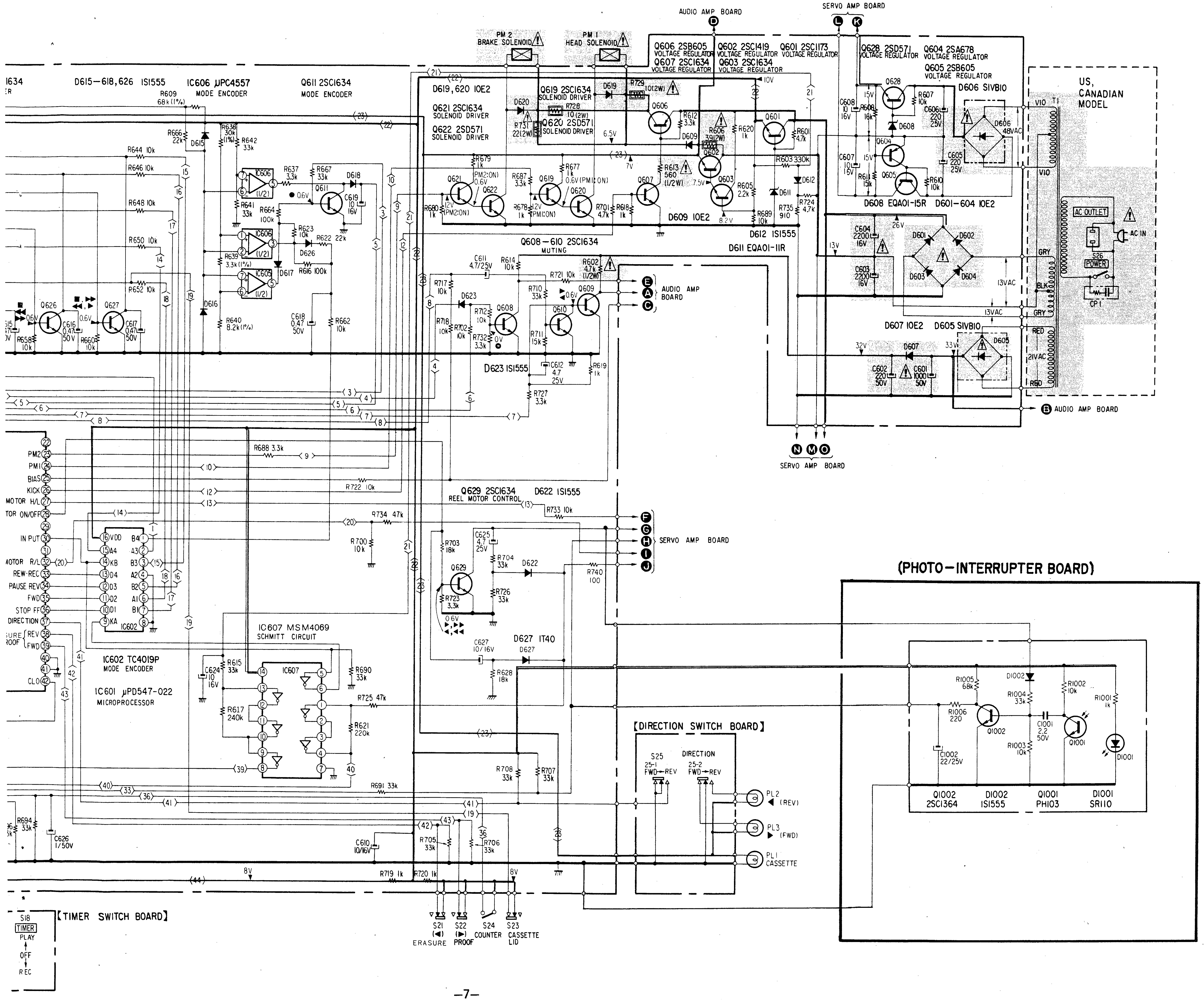
  no mark: stop
- Voltage variations may be noted due to normal production tolerances.
- Switch

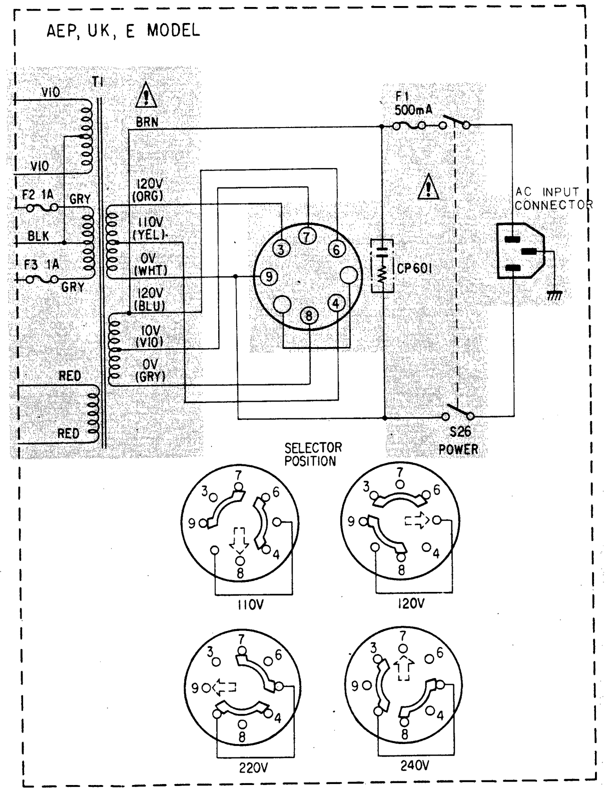
Ref. No.	Switch	Position
S10–15	FUNCTION	FORWARD
S16	PAUSE	OFF
S17	REC MUTE	OFF
S18	TIMER	OFF
S19	MEMORY	OFF
S20	DIRECTION MODE	⮌
S21	REVERSE ERASURE PROOF	OFF
S22	FORWARD ERASURE PROOF	OFF
S23	CASSETTE LID	OFF
S24	TAPE COUNTER	OFF
S25	DIRECTION	FORWARD
S26	POWER	OFF

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un trame et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.


[FUNCTION BUTTON BOARD]
S10 ◀◀
S11 ◀
S12 ■
S13 ▶
S14 ▶▶
S15 ●
S16 II
S17 ◉
R751 18k (1/8W)
R752 20k (1/8W)
R754 130k (1/8W)
R753 43k (1/8W)
R755 22k (1/8W)
R756 33k (1/8W)
P1
J6
[SYSTEM CONTROL BOARD]
[REMOTE CONTROL JACK BOARD]
D613,614 1S1555
IC603–605 µPC4557 MODE ENCODER
Q624–627 2SC1634 MODE ENCODER
D615–618,626 1S1555
R609 68k (1%)
R666 22k
D613
D614
R631 1.8k (1%)
R629 100k (1%)
R632 2.7k (1%)
R633 2k (1%)
R634 1.5k (1%)
R635 1k (1%)
R636 1k (1%)
R630 22k
IC603
IC604
IC605
(1/2)
R643 100k
R645 100k
R659 33k
R647 100k
R657 33k
R649 100k
R655 33k
R651 100k
R653 33k
R644 10k
R646 10k
R648 10k
R650 10k
R652 10k
Q624
Q625
Q626
Q627
C613 0.47 50V
C614 0.47 50V
C615 0.47 50V
C616 0.47 50V
C617 0.47 50V
R654 10k
R656 10k
R658 10k
R660 10k
0.6V
Q631 2SC1634 MODE ENCODER
R661 22k
R626 10k
R625 100
R663 33k
C609 10 16V
R624 10k
Q631
0V
IC601
Vss
TAST
REC
PAUSE
PLAY MUTE
REC MUTE
REW
FF
FWD
REV
SHUT OFF
COUNTER
RES
FG INPUT
TIMER PLAY
TIMER REC
MEMORY PLAY
MEMORY STOP1
CL1
PM2
PM1
BIAS
KICK
REEL MOTOR H/L
REEL MOTOR ON/OFF
IN PUT
REEL MOTOR R/L
REW·REC
PAUSE REV
FWD
STOP FF
HEAD DIRECTION
ERASURE PROOF REV
FWD
CLO
C621 0.01
C620 0.001
L601
VDD
A4
KB
D4
D3
D2
D1
KA
B4
A3
B3
A2
B2
A1
B1
IC602
IC602 TC4019P MODE ENCODER
IC601 µPD547-022 MICROPROCESSOR
[MODE SWITCH BOARD]
PL10 ◉
PL9 II
PL8 ●
PL7 ▶▶
PL6 ▶
PL5 ◀
PL4 ◀◀
R699 4.7k
Q612
Q613
Q614
Q615
Q616
Q617
Q618
R683 3.3k
R686 3.3k
R685 3.3k
R684 3.3k
R681 3.3k
R682 3.3k
R604 2.2k
R675 470
R676 470
R668 1k
R669 1k
R670 1k
R671 1k
R672 1k
R673 1k
R674 10k
Q612–618 2SC1634 LAMP SWITCHING
R692 33k
R693 33k
R697 33k
R698 33k
R695 33k
R696 33k
R694 33k
C626 1/50V
S20 DIRECTION MODE
START
STOP
S19 MEMORY
[TIMER SWITCH BOARD]
S18 TIMER
PLAY
OFF
REC


AUDIO AMP BOARD
SERVO AMP BOARD
PM 2 BRAKE SOLENOID
PM 1 HEAD SOLENOID
Q606 2SB605 VOLTAGE REGULATOR
Q607 2SC1634 VOLTAGE REGULATOR
Q602 2SC1419 VOLTAGE REGULATOR
Q603 2SC1634 VOLTAGE REGULATOR
Q601 2SC1173 VOLTAGE REGULATOR
Q628 2SD571 VOLTAGE REGULATOR
Q604 2SA678 VOLTAGE REGULATOR
Q605 2SB605 VOLTAGE REGULATOR
D606 S1VB10
US, CANADIAN MODEL
D615—618, 626 1S1555
IC606 μPC4557 MODE ENCODER
Q611 2SC1634 MODE ENCODER
D619, 620 10E2
Q619 2SC1634 SOLENOID DRIVER
Q620 2SD571 SOLENOID DRIVER
Q621 2SC1634 SOLENOID DRIVER
Q622 2SD571 SOLENOID DRIVER
D609 10E2
D612 1S1555
D611 EQA01-11R
D608 EQA01-15R
D601—604 10E2
Q608—610 2SC1634 MUTING
AC OUTLET
AC IN
S26 POWER
CP1
D607 10E2
D605 S1VB10
D623 1S1555
Q629 2SC1634 REEL MOTOR CONTROL
D622 1S1555
D627 1T40
IC602 TC4019P MODE ENCODER
IC601 μPD547-022 MICROPROCESSOR
IC607 MSM4069 SCHMITT CIRCUIT
PM2 PM1 BIAS KICK MOTOR H/L MOTOR ON/OFF IN PUT MOTOR R/L REW-REC PAUSE REV FWD STOP FF DIRECTION ERASURE REV FWD CLO
(PHOTO-INTERRUPTER BOARD)
Q1002 2SC1364
D1002 1S1555
Q1001 PH103
D1001 SR110
[DIRECTION SWITCH BOARD]
S25 DIRECTION 25-1 FWD→REV 25-2 FWD→REV
PL2 ◀ (REV)
PL3 ▶ (FWD)
PL1 CASSETTE
[TIMER SWITCH BOARD]
S18 TIMER PLAY OFF REC
S21 (◀) ERASURE
S22 (▶) PROOF
S24 COUNTER
S23 CASSETTE LID

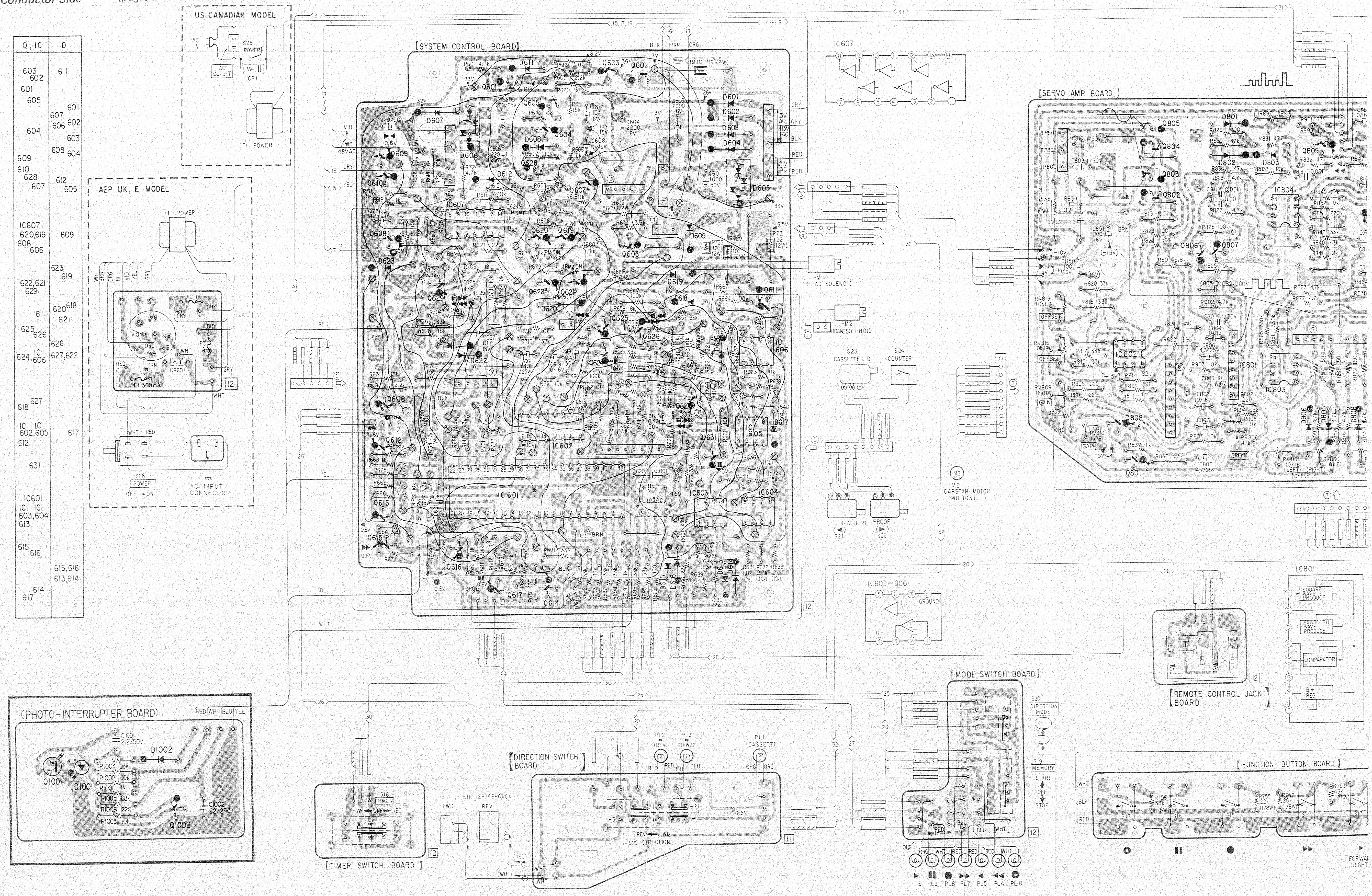

AEP, UK, E MODEL
T1
V10
F2 1A
F3 1A
BLK
GRY
BRN
RED
120V (ORG)
110V (YEL)
0V (WHT)
120V (BLU)
10V (V10)
0V (GRY)
F1 500mA
CP601
AC INPUT CONNECTOR
S26 POWER
SELECTOR POSITION
110V
120V
220V
240V

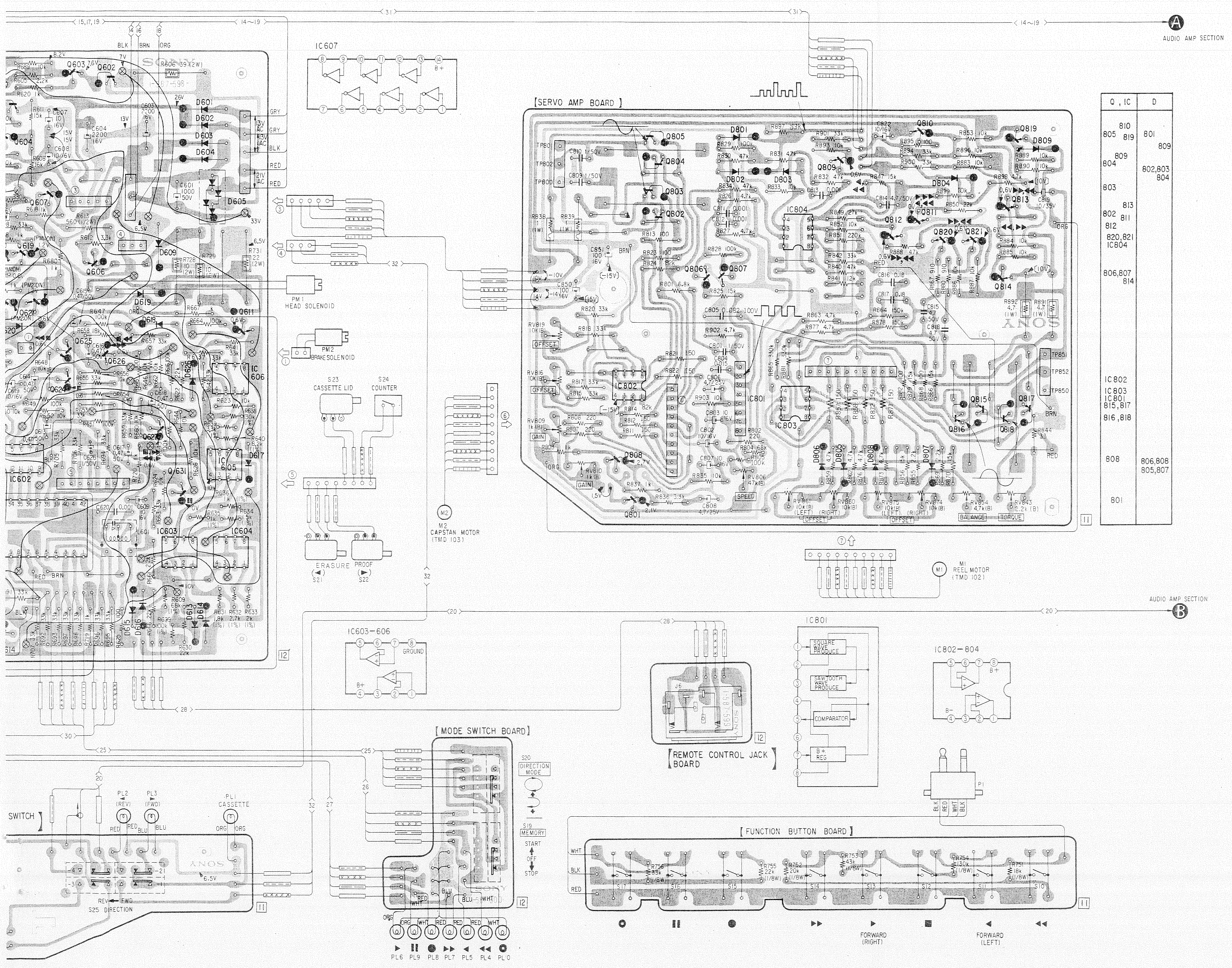
MOUNTING DIAGRAM –System Control Section–

–Conductor Side– (pages 27-29 of the service manual)

● ☐ : added portion

Q , IC	D
603, 602	611
601	
605	
	601
	607
604	606, 602
	603
	608, 604
609	
610	
628	612
607	605
IC607	
620,619	609
608, 606	
	623
	619
622,621	
629	
611	620, 618
	621
625, 626	
	626
624, IC 606	627,622
618, 627	
IC IC 602,605	617
612	
631	
IC601	
IC IC 603,604	
613	
615, 616	
	615,616
	613,614
614	
617	

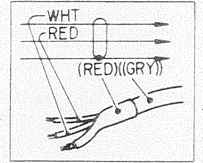

A
B
C
D
E
F
G
H
1
2
3
4
5
US. CANADIAN MODEL
AC IN
S26 POWER
AC OUTLET
CP1
T1 POWER
AEP, UK, E MODEL
T1 POWER
F2 1A
F1 500mA
CP601
S26 POWER
OFF → ON
AC INPUT CONNECTOR
[SYSTEM CONTROL BOARD]
IC607
IC601
IC602
IC603
IC604
IC605
IC606
PM1 HEAD SOLENOID
PM2 BRAKE SOLENOID
S23 CASSETTE LID
S24 COUNTER
M2 CAPSTAN MOTOR (TMD 103)
ERASURE
PROOF
S21
S22
IC603-606
GROUND
[SERVO AMP BOARD]
IC801
IC802
IC803
IC804
OFFSET
GAIN
SPEED
[REMOTE CONTROL JACK BOARD]
SQUARE WAVE PRODUCE
SAWTOOTH WAVE PRODUCE
COMPARATOR
B+ REG
(PHOTO-INTERRUPTER BOARD)
Q1001
D1001
D1002
Q1002
[TIMER SWITCH BOARD]
S16 TIMER
PLAY
OFF
REC
EH (EF148-61C)
FWD
REV
[DIRECTION SWITCH BOARD]
PL2 (REV)
PL3 (FWD)
PL1 CASSETTE
S25 DIRECTION
[MODE SWITCH BOARD]
S20 DIRECTION MODE
S19 MEMORY
START
OFF
STOP
PL6
PL9
PL8
PL7
PL5
PL4
PL0
[FUNCTION BUTTON BOARD]
FORWARD (RIGHT)


D
E
F
G
H
I
J
AUDIO AMP SECTION
IC607
[SERVO AMP BOARD]
IC603–606
IC801
SQUARE WAVE PRODUCE
SAW-TOOTH WAVE PRODUCE
COMPARATOR
B+ REG
IC802–804
[MODE SWITCH BOARD]
[REMOTE CONTROL JACK BOARD]
[FUNCTION BUTTON BOARD]
PM1 HEAD SOLENOID
PM2 BRAKE SOLENOID
S23 CASSETTE LID
S24 COUNTER
M2 CAPSTAN MOTOR (TMD 103)
M1 REEL MOTOR (TMD 102)
ERASURE PROOF
S21
S22
S20 DIRECTION MODE
S19 MEMORY
START
OFF
STOP
SWITCH
PL2 (REV)
PL3 (FWD)
PL1 CASSETTE
S25 DIRECTION
REV
FWD
P1
OFFSET
GAIN
SPEED
BALANCE
TORQUE
FORWARD (RIGHT)
FORWARD (LEFT)
PL6
PL9
PL8
PL7
PL5
PL4
PL0
S17
S16
S15
S14
S13
S12
S11
S10

Q , IC	D
810	
805 819	801
	809
809 804	802,803 804
803	
813	
802 811	
812	
820,821 IC804	
806,807 814	
IC802	
IC803 IC801 815,817	
816,818	
808	806,808 805,807
801	

Replacement Semiconductors: See page 4.

- Color code of sleeving over the end of the jacket.


WHT
RED
(RED)((GRY))

- ○—: parts extracted from the component side.
- ●—: parts extracted from the conductor side.
- ⊗ : Through hole.
- ⊗—⊗ : component-side pattern
- ▨ : B + (high) pattern
- ▨ : B + (low) pattern
- ▨ : B – pattern

12, 13, 14